IEI Technology Corp.



MODEL:

SPCIE-3600AM2

Full-size AMD Socket AM2 PICMG 1.3 CPU Card supports Opteron™, Athlon™ 64 x2, Athlon™ 64 and Sempron™ processors, 28 PCIe Expansion Lanes, Dual GbE, Six SATA 2.0, Ten USB 2.0 and CRT Output

User Manual

Rev. 1.00 JANUARY 2008

RoHS Lead Free

Revision

Date	Version	Changes
2008-01-28	1.00	Initial release

Copyright

COPYRIGHT NOTICE

TRADEMARKS

Manual Conventions

WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word "warning" is written as "**WARNING**," both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the SPCIE-3600AM2 or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the SPCIE-3600AM2. Cautions are easy to recognize. The word "caution" is written as "**CAUTION**," both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the SPCIE-3600AM2. Please take caution messages seriously.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word "note" is written as "**NOTE**," both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the SPCIE-3600AM2. Please take note messages seriously.

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the SPCIE-3600AM2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the SPCIE-3600AM2 package.

- 1 x SPCIE-3600AM2 single board computer
- 1 x IDE cable
- 3 x SATA power cables
- 6 x SATA cables
- 1 x Dual RS-232 cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

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BIOS Menus

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Introduction

1.1 Overview

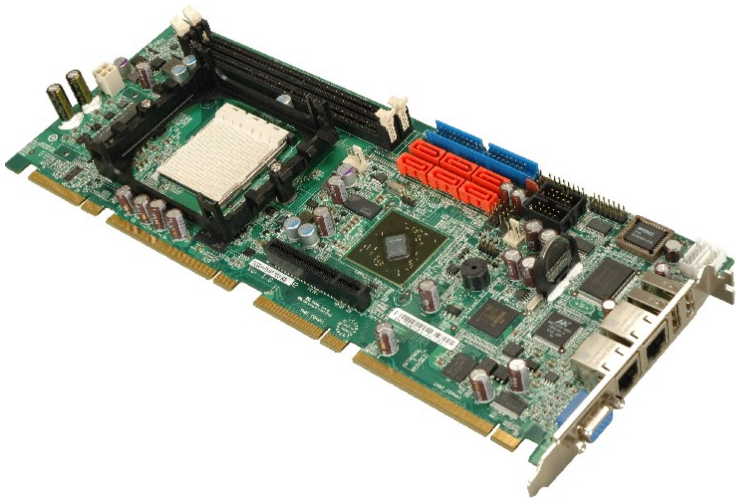


Figure 1-1: SPCIE-3600AM2 PICMG 1.3 CPU Card

The SPCIE-3600AM2 PICMG 1.3 form factor CPU card is an AMD Socket AM2 CPU processor platform with an integrated NVIDIA MCP55PRO system chipset. The SPCIE-3600AM2 is coupled with the specially designed backplanes to provide access to up to 28 PCI Express (PCIe) lanes.

Two 2.0 GB DDR2 SDRAM DIMMs support a maximum of 4.0 GB DDR2 system memory. Six SATA II drives with 3.0 Gbps data transmission rates one IDE interface and one provide flexible storage options. Ten USB 2.0 interfaces and four PCI expansion lanes (interfaced to the backplane) provide further expansion options. Dual gigabit Ethernet (GbE) controllers facilitate external Internet connectivity. An XGI Volari™ PCI graphics controller supports analog CRT display output and connectivity to standard CRT monitors through an external VGA connector.

1.1.1 SPCIE-3600AM2 Expansion Options

1.1.1.1 PCI Express (PCIe) Expansion

There are 28 PCIe x1 lanes on the SPCIE-3600AM2. Of these, 20 PCIe x1 lanes are interfaced to the IEI SPXE backplane through the PICMG 1.3 form factor edge connectors on the bottom of the CPU card. The remaining eight PCIe x1 lanes are interfaced to the

SPXE backplane through a PCIe x8 connector on the CPU card to a corresponding PCIe x8 connector on the backplane.

1.1.1.2 PCI Expansion

An additional four PCI lanes are interfaced to the backplane through the standard PCI edge connectors on the bottom of the SPCIE-3600AM2 CPU card.

1.1.1.3 USB 2.0 Expansion

Ten USB 2.0 interfaces are also available. Six of the USB 2.0 interfaces are implemented directly on the SBC (four internal and two external) and the remaining four USB 2.0 interfaces are connected to the backplane through the edge connectors.

1.1.2 SPCIE-3600AM2 Features

Some of the SPCIE-3600AM2 features are listed below.

- Supports the following AMD Socket AM2 processors:
  - Opteron™
  - Athlon™ 64 X2
  - Athlon™ 64
  - Sempron™
- Supports two 240-pin 2.0 GB (max.) 533 MHz, 667 MHz or 800 MHz DDR2 SDRAM DIMM (system max. 4.0 GB)
- Six SATA II drives with data transfer rates of 3.0 Gbps supported
- Two Ultra ATA 133, Ultra ATA 100, Ultra ATA 66 or Ultra ATA 33 IDE HDDs supported
- Ten USB 2.0 devices supported (six on-board and four on the backplane)
- Dual GbE Ethernet connectors
- PICMG 1.3 form factor
- RoHS compliant
- Supports ATX power supplies

1.2 SPCIE-3600AM2 Overview

1.2.1 SPCIE-3600AM2 Overview Photo

The SPCIE-3600AM2 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the SPCIE-3600AM2.

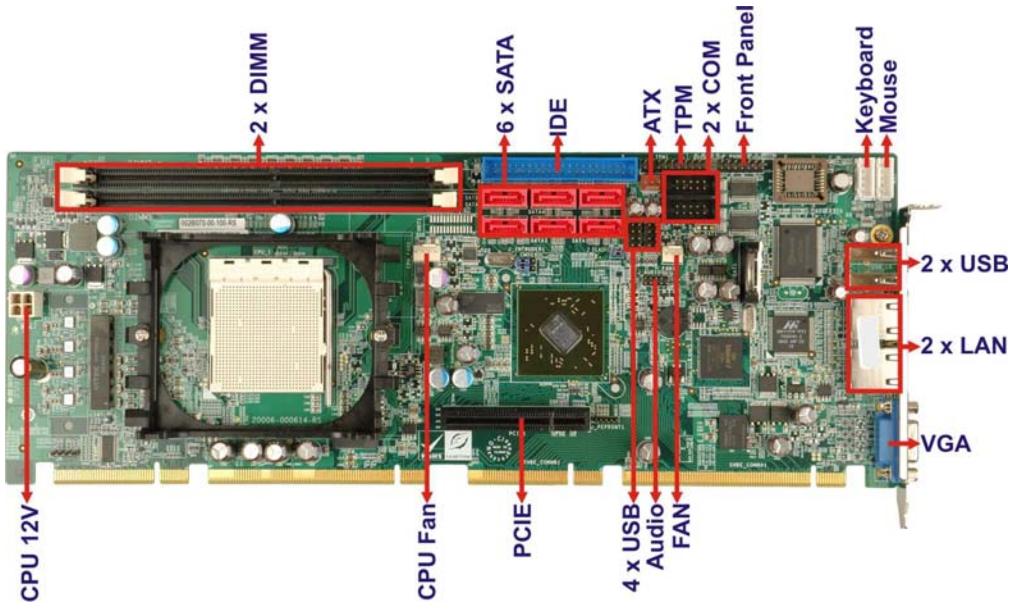


Figure 1-2: SPCIE-3600AM2 Overview [Front View]

1.2.2 SPCIE-3600AM2 Peripheral Connectors and Jumpers

The SPCIE-3600AM2 has the following connectors on-board:

- 1 x Audio connector
- 1 x ATX power supply enable connector
- 1 x Fan connector
- 1 x Front panel connector
- 1 x IDE disk drive connector
- 1 x Keyboard connector
- 1 x Mouse connector
- 2 x RS-232 serial port connectors
- 6 x Serial ATA II (SATA II) drive connectors
- 1 x TPM connector

- 2 x USB 2.0 connectors (each connect to two USB2.0 devices)s

The SPCIE-3600AM2 has the following external peripheral interface connectors on the board rear panel.

- 2 x Ethernet connectors
- 2 x USB2.0 port connectors
- 1 x VGA connector

The SPCIE-3600AM2 has the following on-board jumpers:

- Clear CMOS

1.2.3 Technical Specifications

SPCIE-3600AM2 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	**SPCIE-3600AM2**
Form Factor	PICMG 1.3
System CPU	AMD Socket AM2 Opteron™ AMD Socket AM2 Athlon™ 64 x2 AMD Socket AM2 Athlon™ 64 AMD Socket AM2 Sempron™
HyperTransport™ Technology	HyperTransport™ interfaces supported
System Chipset	NVIDIA MCP55Pro
Memory	Two 240-pin 2.0 GB (max.) 800 MHz, 667 MHz or 533 MHz dual-channel DDR2 SDRAM DIMM supported (system max. 4.0 GB)
Super I/O	Winbond W83627EHG
BIOS	AMI BIOS label 1MB SPI EEPROM
Display	CRT output via XGI Volari™ Z9s PCI graphics controller

Audio	HD audio				
LAN	Dual Marvell 88E1121 GbE controller				
COM	Two RS-232 serial ports				
USB2.0	Ten USB 2.0 devices supported, six on-board and four on the backplane				
IDE	One 40-pin IDE connector connects to two Ultra ATA/33, Ultra ATA/66, Ultra ATA/100 or Ultra ATA /133 devices				
SATA	Six 3.0 Gbps SATA II drives supported				
Keyboard/mouse	Two keyboard/mouse wafer connectors				
Expansion	Twenty-eight PCIe lanes Four PCI lanes				
Watchdog Timer	Software programmable 1-255 sec. by super I/O				
Power Supply	ATX power				
Power Consumption	**3.3 V**	**5 V**	**5 Vsb**	**12 V**	**Vcore**
	4.83 A	2.53 A	0.45 A	0.2 A	4.98 A
	Running 3DMarkR 2001 SE with an AMD Sempron™ 3600+ processor and one 1.0 GB 667 MHz DDR2 DIMM				
Temperature	0ºC – 60ºC (32ºF - 140ºF)				
Humidity (operating)	5%~95% non-condensing				
Dimensions (LxW)	338.58 mm x 126.39 mm				
Weight (GW)	1.2 kg				

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 338.58 mm
- **Width**: 126.39 mm

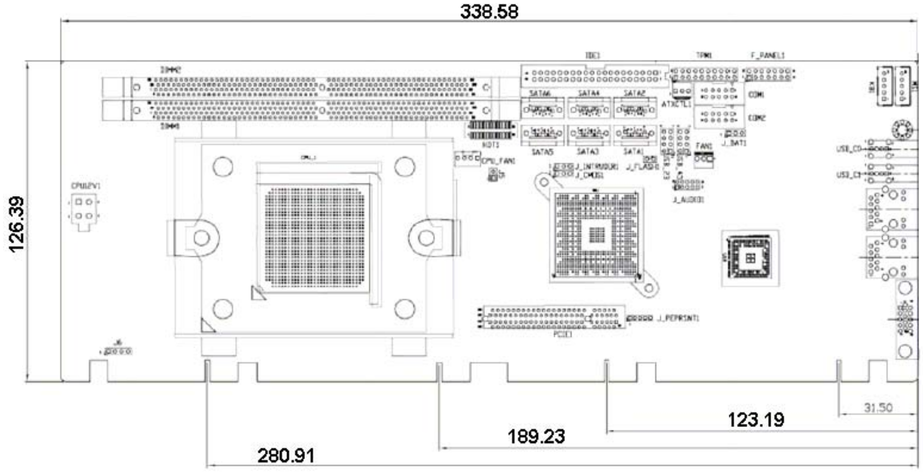


Figure 2-1: SPCIE-3600AM2 Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

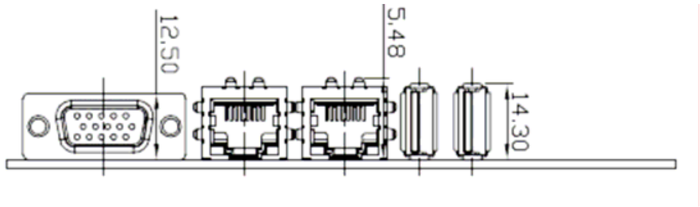


Figure 2-2: External Interface Panel Dimensions (mm)

2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

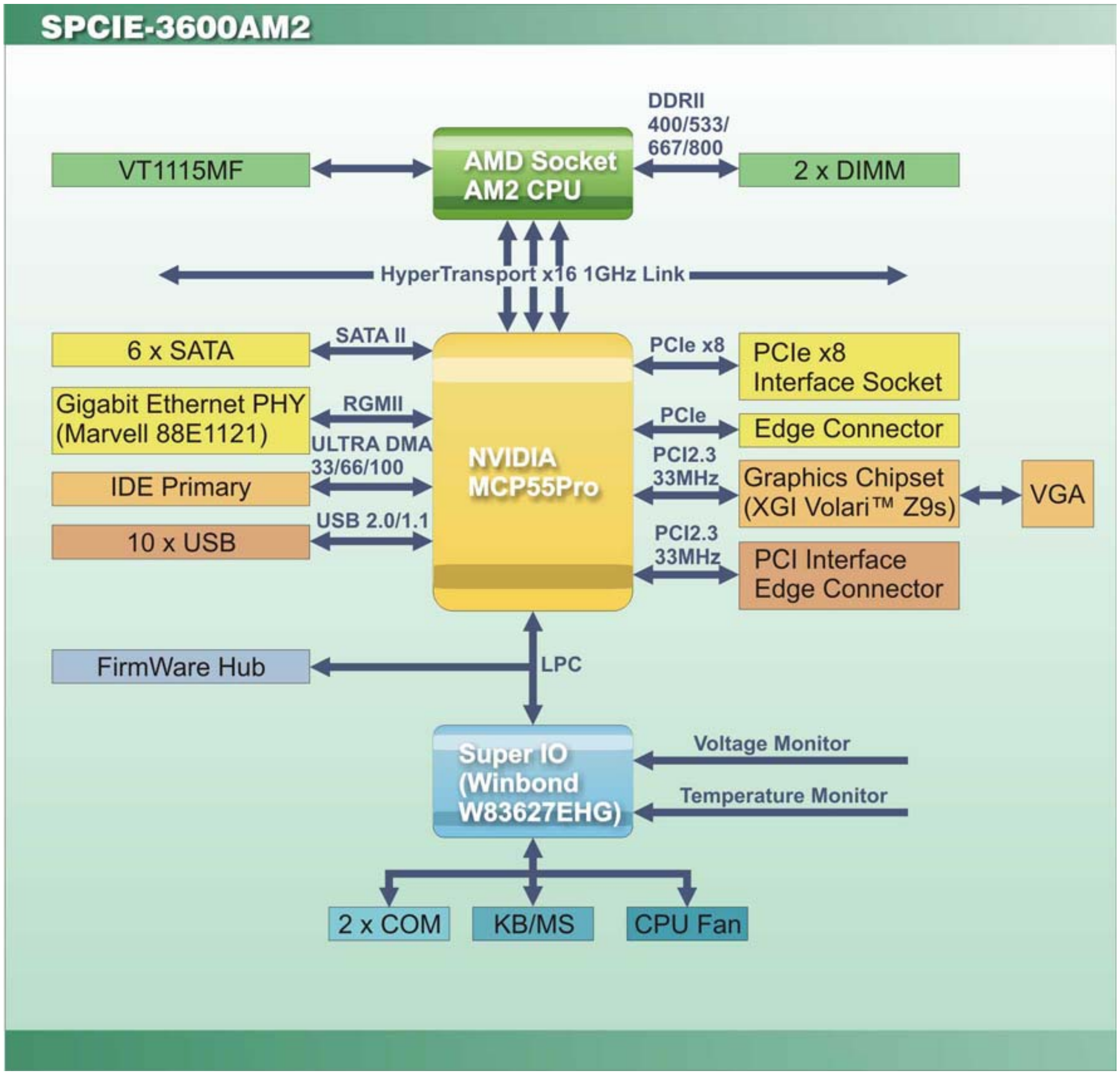


Figure 2-3: Data Flow Block Diagram

2.3 Compatible Processors

2.3.1 Supported Processors

The SPCIE-3600AM2 supports the following AMD Socket S1 processors

- AMD Socket AM2 Opteron™
- AMD Socket AM2 Athlon™ 64 x2
- AMD Socket AM2 Athlon™ 64
- AMD Socket AM2 Sempron™

2.3.2 Processor Features

All the processors listed in the previous section support the following features:

- Compatible with existing 32-bit code base
  - Including support for SSE, SSE2, SSE3*, MMX™, 3DNow!™ technology and legacy x86 instructions
  - Runs existing operating systems and drivers
  - Local APIC on-chip
- AMD64 technology
  - AMD64 technology instruction set extensions
  - 64-bit integer registers, 48-bit virtual addresses, 40-bit physical addresses
  - Eight additional 64-bit integer registers (16 total)
  - Eight additional 128-bit SSE registers (16 total)
- Machine check architecture
  - Includes hardware scrubbing of major ECC protected arrays

2.3.3 L1 and L2 Cache

The L1 cache on all the processors has the following features

- 64 KB two-way associative ECC protected L1 data cache
  - Two 64-bit operations per cycle, 3-cycle latency
- 64 KB two-way associative parity-protected L1 Instruction Cache

The L2 cache sizes for the processors are listed below:

Processor	L2 Cache Size
AMD Opteron™ (dual-core)	1024 KB per core
AMD Athlon™ 64 X2 (dual-core)	1024 KB or 512 KB per core
AMD Athlon™ 64 (single-core)	1024 KB, 512 KB or 256 KB
AMD Sempron™	256 KB or 128 KB

Table 2-1: Technical Specifications

2.3.4 DDR2 Memory Controller

All processors supported by the SPCIE-3600AM2 CPU card have their own DDR2 memory controller. The DDR2 controller has the following features:

- Low-latency, high-bandwidth
- Supports up to two un-buffered DDR2 DIMM
- Each DIMM has a maximum capacity of 2GB
- Supports 800 MHz, 667 MHz, 533 MHz or 400 MHz DDR2 DIMM

The DDR2 controller on the processor is interfaced to two SO-DIMM sockets on the SPCIE-3600AM2.

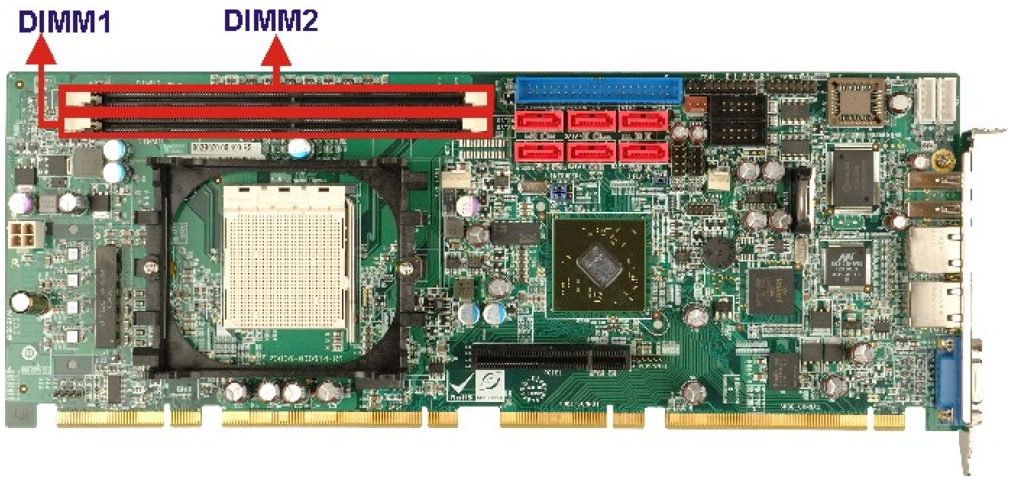


Figure 2-4: DIMM Sockets

2.3.5 Processor Power Management

The supported processors have the following power management features:

- Multiple low-power states
- System Management Mode (SMM)
- ACPI compliant, including support for processor performance states

The AMD Athlon™ 64 X2 additionally supports the power management features below.

- AMD PowerNow!™ technology is designed to dynamically switch between

multiple low-power states based on application performance requirements.

2.3.6 HyperTransport™ Technology

All the processors have one 16-bit link supporting speeds up to 800 MHz (1600 MTps) or 3.2 GBps in each direction. The HyperTransport™ Technology link is connected to the NVIDIA MCP55Pro system chipset described below and shown in **Figure 2-5**.

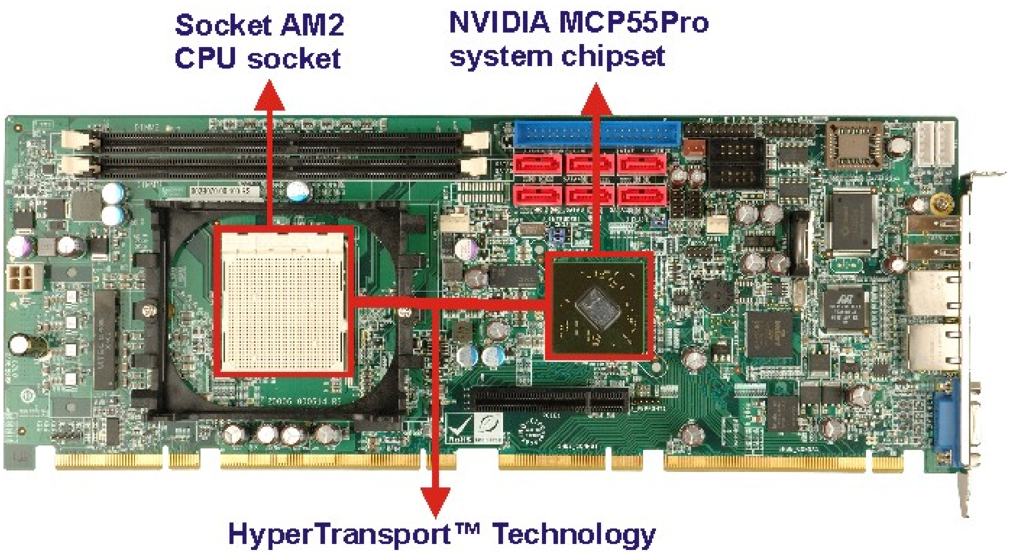


Figure 2-5: HyperTransport™ Technology Link

2.4 NVIDIA MCP55Pro

2.4.1 HyperTransport™ Link

A 1.0 GHz HyperTransport™ x16 bus interfaces the NVIDIA MCP55Pro to the AMD Socket AM2 processor (see **Figure 2-5**) installed on the SPICE-3600. Some of the features of the HyperTransport™ link are listed below:

- High-speed, differential, low voltage interface
- Total bandwidth up to 1.0 GHz for a total bandwidth of 8.0 GBps
- Supports coherent and non-coherent data types
- Supports isochronous and non-isochronous data channels
- Supports real-time link reconnect/disconnect
- Generates Sync Flood on detection of uncorrectable errors in the system

- Clock spread spectrum capability

2.4.2 PCI Express Interface

2.4.2.1 PCIe Express Overview

The NVIDIA MCP55Pro PCIe bus is compliant with the PCI Express 1.1a Specifications. The PCIe bus supports 2.5 GHz data transfers with a total transmission rate of 2.5 Gbps per direction per lane. There are a total of 28 PCIe lanes that can be configured in the following way

- x16, x8, x1, x1, x1, x1
- x16, x8, x4
- x16, x8, x4, x2, x2
- x8, x8, x4, x4, x4
- x8, x8, x8, x4
- x8, x4, x4, x4, x4, x4

Twenty PCIe lanes are interfaced to the backplane through the standard PCIe x16 and PCIe x4 edge connector on the bottom of the board. The remaining eight lanes are interfaced from a PCIe x8 slot connector on the SPCIE-3600AM2 to a corresponding PCIe x8 slot connector on the backplane with a specially designed separately purchased PCIe cable.

2.4.2.2 PCIe x16 Expansion

The PICMG 1.3 form factor specification requires that 16 PCIe lanes are interfaced to the backplane through a standard edge connector on the bottom of the CPU card. The SPCIE-3600AM2 PCIe x16 edge connector is shown in **Figure 2-6** below.

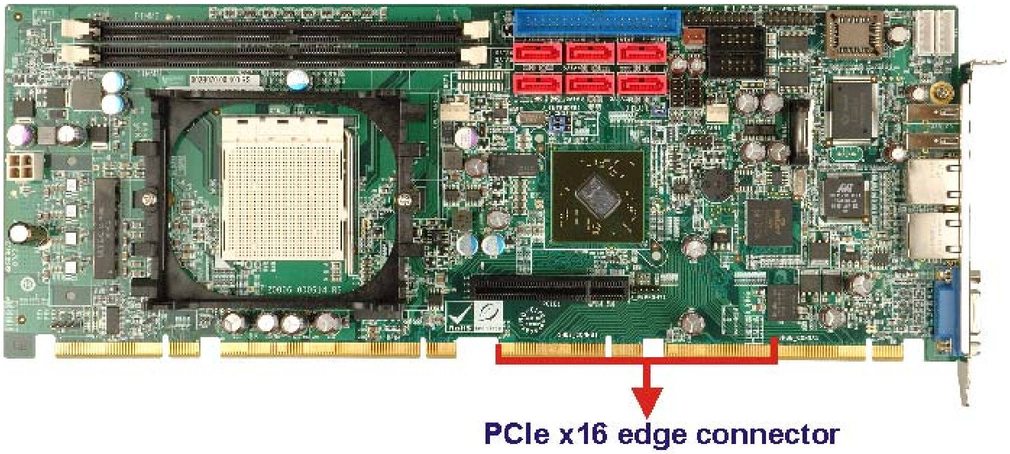


Figure 2-6: PCIe x16 Edge Connector

2.4.2.3 PCIe x1 Edge Connector

The PICMG 1.3 form factor specification requires that four PCIe x1 lanes are interfaced to the backplane through a standard edge connector on the bottom of the CPU card. The SPCIE-3600AM2 PCIe x1 edge connector is shown in **Figure 2-7** below.

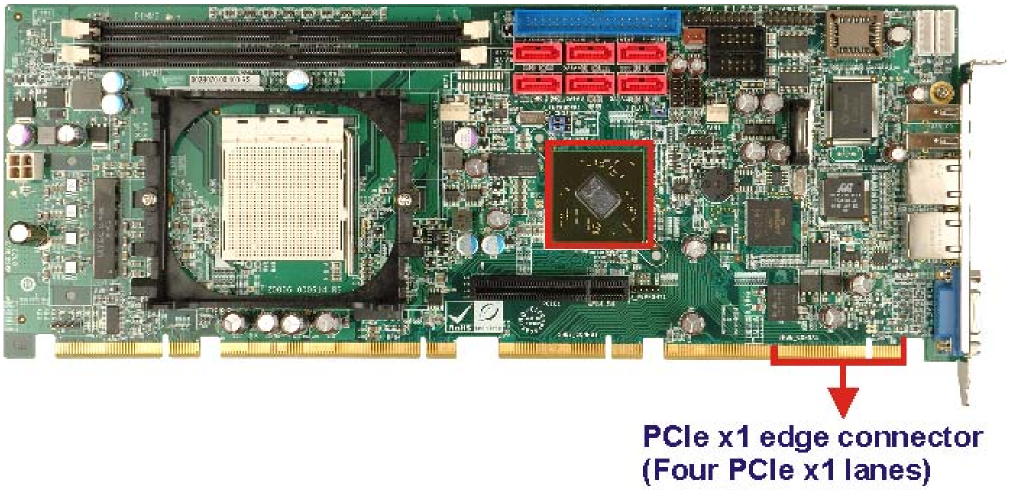


Figure 2-7: PCIe x1 Edge Connector

2.4.2.4 PCIe x8 Expansion Connector

The remaining eight PCIe x1 lanes from the NVIDIA MCP55Pro system chipset are interfaced to an on-board PCIe x8 expansion connector. A PCIe x8 board-to-board

connector interface is used to connect the PCIe x8 on the SPCIE-3600AM2 CPU card to a corresponding PCIe x8 expansion connector on the backplane. The PCIe x8 expansion connector is shown in below.

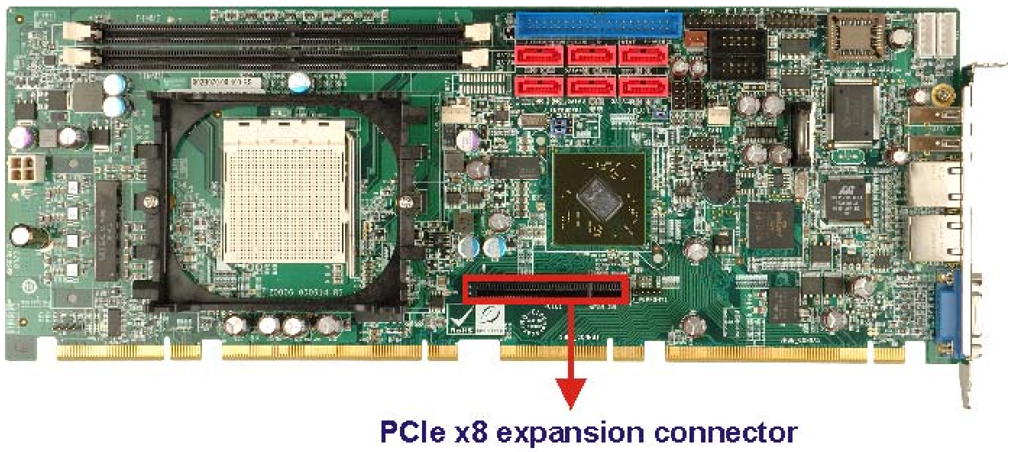


Figure 2-8: PCIe x8 Expansion Connector

2.4.3 XGI Volari™ Z9s Graphics Chipset

2.4.3.1 Graphics Chipset Overview

An ultra low power XGI Volari™ Z9s graphics chipset capable of providing VGA display output up to 1600x1200 is interfaced through one of the five PCI lanes to the NVIDIA MCP55Pro. The XGI Volari™ Z9s is then connected to an external DB-15 VGA connector. The graphics controller and the VGA connector are shown in **Figure 2-9**.

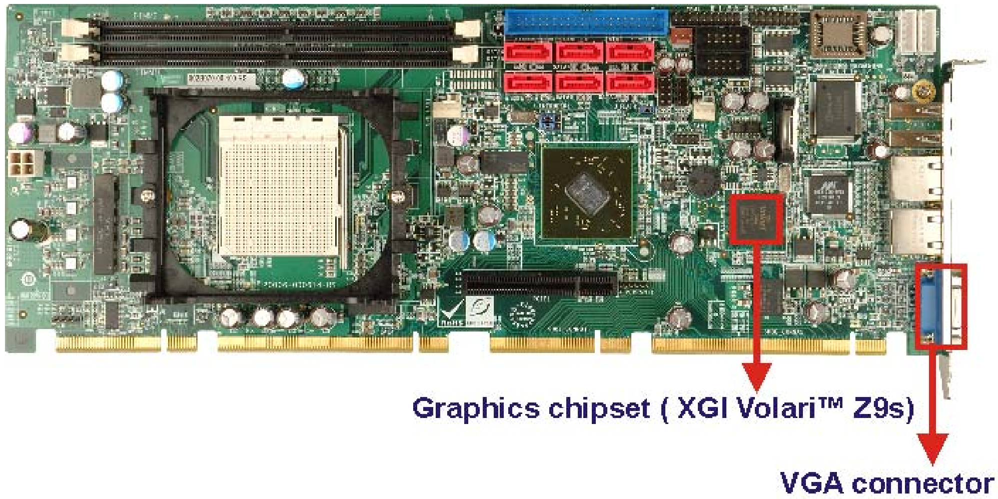


Figure 2-9: Graphics Controller and VGA Connector

2.4.3.2 Resolution, Color and Frame Rate

The XGI Volari™ Z9s chipsets supports monitors with the following resolutions, colors and frame rates.

- 230 MHz pixel clock supported
- VESA standard super high resolution graphics modes supported:
  - 640 x 480 16/256/32K/64K/16M colors 160 Hz NI
  - 800 x 600 16/256/32K/64K/16M colors 160 Hz NI
  - 1024 x 768 256/32K/64K/16M colors 120 Hz NI
  - 1280 x 1024 256/32K/64K/16M colors 85 Hz NI
  - 1600 x 1200 256/32K/64K/16M colors 70 Hz NI
- Low resolution modes

2.4.3.3 High Performance 2D Accelerator

The XGI Volari™ Z9s chipsets has a sophisticated 2D accelerator with the following features.

- Built-in hardware command queue
- Built-in Direct Draw Accelerator
- Built-in GDI 2000 Accelerator
- Built-in an 1T pipelined 64-bit BITBLT graphics engine with the following

functions:

- o 256 raster operations
- o Rectangle fill
- o Color expansion
- o Enhanced color expansion
- o Line-drawing with styled pattern
- o Built-in bytes pattern registers
- o Built-in 8x8 mask registers
- o Rectangle clipping
- o Transparent BitBlt with source and destination keys

- Source data in command queue Bitblt
- Supports memory-mapped, zero wait-state, burst engine write
- Built-in 64x64x2 bit-mapped mono hardware cursor
- Maximum 256MB frame buffer with linear addressing
- Built-in source read-buffer to minimize engine wait-state
- Built-in destination read-buffer to minimize engine wait-state

2.4.4 IDE Interface Controller

The IDE controller on the NVIDIA MCP55Pro is interfaced to a single 40-pin IDE connector on the SPCIE-3600AM2 and connects to two HDD. The IDE controller specifications are listed below.

- 5V-tolerant interface with support for two devices (master and slave)
- Industry-standard PCI bus master IDE (BM-IDE) register set compliant with Microsoft BM-IDE drivers
- Supports Ultra DMA modes 6–0 (UltraDMA-133/100/66/33)
- Supports standard PIO modes 4-0
- Supports standard DMA modes 2-0
- Supports scatter-gather function

The IDE connector is shown in **Figure 2-10** below.

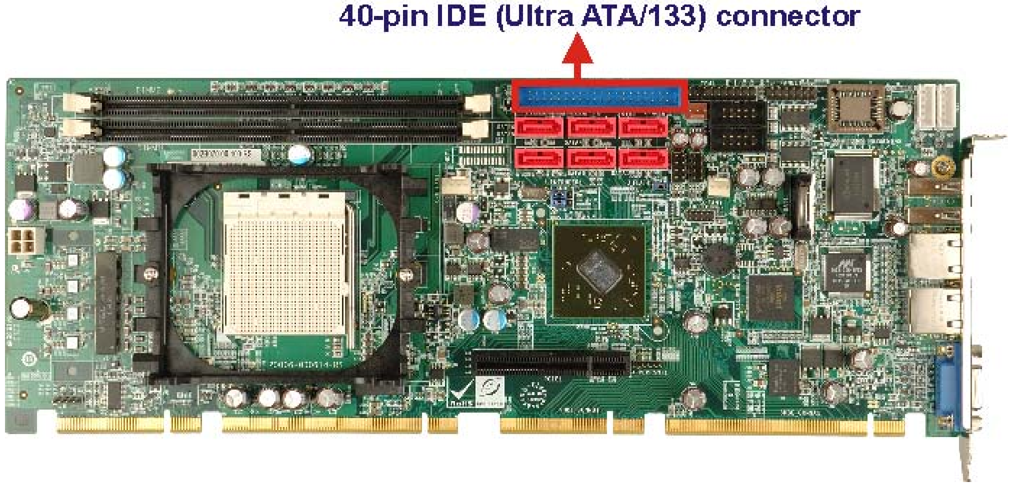


Figure 2-10: 40-pin IDE Connector

2.4.5 PCI Host Bus Controller

The NVIDIA MCP55Pro supports five PCI lanes. The PCI bus is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI rev. 2.3 specifications
- 5.0 V tolerant
- Supports five external PCI slots at 33 MHz
  - PCI REQ/GNT pairs support
  - Five bus master arbitrations supported
- PCI master and slave interfaces
- Master-initiated and slave-initiated terminations supported
- Bidirectional write posting support for concurrency
- Flexible routing of all PCI interrupts
- PCI bus errors such as data parity, command parity, and target aborts can be programmed to generate Sync Flood on the HyperTransport interface
- Supports read ahead—memory read line (MRL) and memory read multiple (MRM)
- Clock spread spectrum capability

Four of the five PCI bus lanes are interfaced to the backplane through an edge connector on the bottom of the CPU card. The fifth PCI connector is interfaced to a PCI graphics controller (see above).

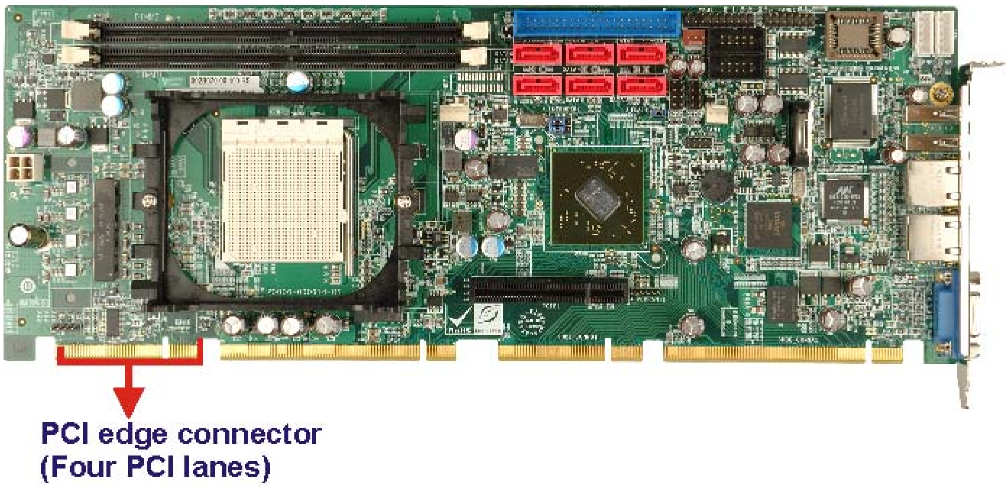


Figure 2-11: PCI Bus Edge Connector

2.4.6 SATA Controllers

Six 3.0 Gbps SATA II drives are supported by three independent SATA controllers. The SATA II controllers have the following features:

- Compliant with ATA/ATAPI-7 Volume 3
- Supports Native Command Queueing (NCQ)
- Supports Tagged Command Queueing (TCQ)
- High speed, low voltage, low pin count
- 3.0 Gbps transmissions in both directions
- Supports power-down capabilities
- Supports Serial ATA ATAPI devices
- Hot plug support
- Clock spread spectrum capability

The six SATA II controllers are shown in below:

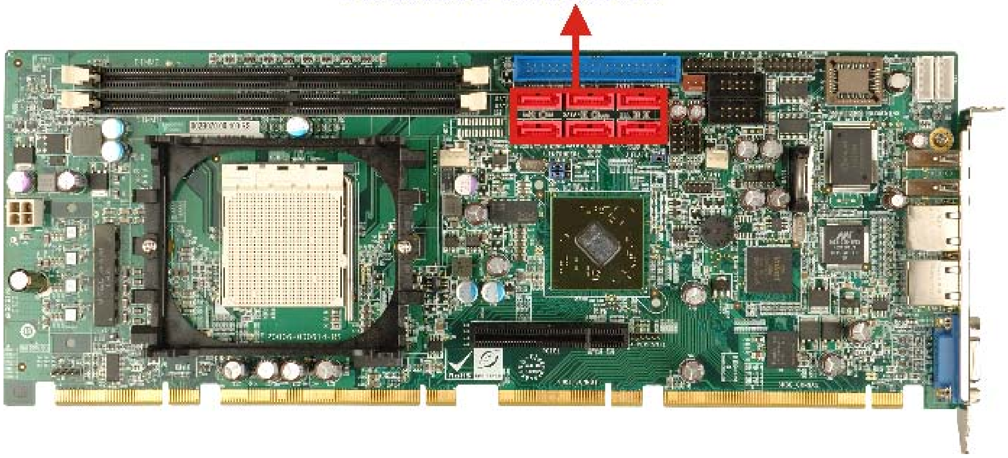


Figure 2-12: SATA II Connectors

2.4.7 USB Controllers

The NVIDIA MCP55Pro system chipset on the SPCIE-3600AM2 supports up to ten high-speed, full-speed or low-speed USB devices. High-speed USB 2.0, with data transfers of up to 480 MBps and is enabled on the NVIDIA MCP55Pro by the integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling are enabled with the integrated Universal Host Controller Interface (UHCI) controllers.

Six of the ten USB ports are implemented on the SPCIE-3600AM2 CPU card. The remaining four USB ports can be implemented on the backplane. The USB controller supports the following:

- USB 2.0 Enhanced Host Controller Interface (EHCI) and USB 1.1
- Open Host Controller Interface (OHCI) controllers (supports up to ten ports)
- Supports transfer rates at high speed (480 Mb/s), full speed (12 Mb/s), and low speed (1.2 Mb/s)
- High-speed devices default to EHCI
- Full speed and low speed devices automatically delegated to OHCI
- Allows USB concurrency
- Five over-current protection inputs

- Can be configured in any grouping

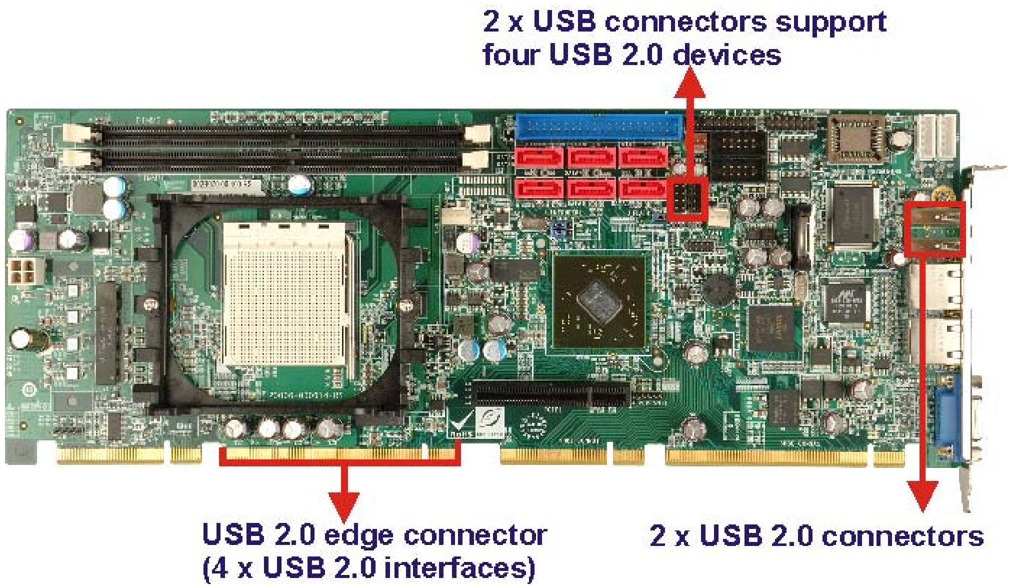


Figure 2-13: USB Connectors and USB Edge Connector

2.4.8 Gigabit Ethernet Connector

A media access controller (MAC) on the NVIDIA chipset is interfaced to a Marvell 88E1121 PHY through a Reduced Gigabit Media Independent Interface (RGMII). The Marvell 88E1121 PHY is a GbE controller and is interfaced to two external LAN connectors. The LAN connectors and the Marvell 88E121 PHY are shown in **Figure 2-14**.



Figure 2-14: LAN Connectivity

2.4.9 LPC Bus

The NVIDIA MCP55Pro LPC bus is LPC revision 1.0 compatible and comes with the following specifications.

- Low Pin Count 1.0 compatible interface
- Integrated LPC bridge
- Subtractive decode
- LPC DMA mastering and supports two LPC DMA masters
- Serial interrupt protocol support
- Ability to disable LPC bridge when multiple MCP55Pro processors are present on the board

The LPC bus components are described in **Section 2.5** below.

2.4.10 SMBus Controller

The NVIDIA MCP55Pro has dual SMBus 2.0 Interfaces that have the following specifications.

- Supports System Management Bus (SMBus) host and slave
- Supports Address Resolution Protocol (ARP)
- Supports embedded controller (EC)

2.4.11 Interrupt Controller

The interrupt controller has the following features:

- Dual 8259 Programmable Interrupt Controllers (PICs) supports 15 interrupts (Interrupts generated by the PICs become output signals when MCP55Pro is configured as a slave device)
- 82093-compatible I/O Advanced Programmable Interrupt Controller (APIC) supports 24 interrupts
- PCI interrupt routing and masking
- Independent edge/level triggered interrupts
- Interrupt sharing for all internal devices

2.4.12 DMA Controller

The DMA controller has the following features.

- Dual 8237 supports seven independently programmable channels
- Standard page registers allow 24-bit addressing
- 8254 programmable interval timer counter based on 14.31818 MHz clock
- MC146818A/DS12887-compatible RTC with 512-byte battery backed-up RAM

2.4.13 HD Audio

The SPCIE-3600AM2 on-board audio connector can connect to an optional audio kit through an on-board audio connector. The codec on the optional audio kit is connected to the NVIDIA MCP55Pro audio controller through the High Definition audio. Supported HD Audio features are listed below:

- High Definition Audio Specification 1.0 compliant
- Supports eight independent streams, four input and four output
- Supports up to 16 channels per stream
- Supports both 44.1 kHz and 48 kHz sample formats
- Supports streams with sample rates up to 192 kHz
- Supports streams with sample widths up to 32 bits
- High Definition Audio link supports up to three audio or modem codecs in any

combination

- Compliant with Microsoft's Universal Audio Architecture (UAA) initiative
- Standard interface supported by Microsoft in-the-box audio drivers
- Independent DMA controllers for each stream
- All DMA controllers support 64-bit addressing and scatter-gather functionality

2.4.14 Timer and RTC (Real Time Clock)

The NVIDIA MCP55Pro system chipset supports the following:

- 8254 programmable interval timer counter based on 14.31818 MHz clock
- MC146818A/DS12887 compatible RTC with 512-byte battery backed-up RAM

2.5 LPC Bus Components

2.5.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset



Figure 2-15: LPC BUS Components

2.5.2 BIOS Chipset:

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

2.5.3 Winbond W83627EHG Super I/O chipset

The Winbond W83627EHG Super I/O chipset is connected to the MCP55Pro system chipset through the LPC bus.

The Winbond W83627EHG is an LPC interface-based Super I/O device that comes with Environment Controller integration, floppy disk controller, UART controller and IR controller. Some of the features of the Winbond W83697HG chipset are listed below:

- LPC Spec. 1.01 compliant
- LDRQ# (LPC DMA) and SERIRQ (serial IRQ) supported
- Hardware monitor functions integrated
- Microsoft PC2000/PC2001 Hardware Design Guide compliant
- ACPI DPM (Device Power Management) supported

Some of the Super I/O features are described in more detail below:

2.5.3.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.01. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.5.3.2 Super I/O UART Controller

There are two high-speed 16550 compatible UART controllers integrated onto the Super I/O chipset. Both controllers have 16-byte send/receive FIFO. Some of the features of the UART controllers are listed below:

- MIDI compatible
- Fully programmable serial-interface characteristics:
    - 5, 6, 7, or 8-bit characters
    - Even, odd or no parity bit generation/detection
    - 1, 1.5 or 2 stop bits generation
- Internal diagnostic capabilities:
    - Loop-back control for communications link fault isolation
    - Break, parity, overrun, framing error stimulation
- Programmable baud generator allows division of 1.8461 MHz and 24 MHz by 1 to (2^{16} – 1)
- Maximum baud rate up to 921 kbps for 14.769 MHz and 1.5 Mbps for 24 MHz

2.5.3.3 Super I/O Hardware Monitor Functions

The Super I/O Hardware Monitor monitors internal voltages, system temperature and the cooling fan speed. All the monitored environmental parameters can be read from the BIOS Hardware Health Configuration menu.

2.5.3.4 Super I/O Keyboard and Mouse Controller

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported
- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset

- 8-bit timer/counter

The keyboard and mouse controller controller is interfaced to a keyboard and mouse connected to the backplane through the board-to-board connectors.

2.5.3.5 Super I/O Fan Speed and Fan Control

The super I/O can both monitor and control the fan speed. The super I/O is interfaced to the fan on the backplane through the board-to-board connectors. These settings can be controlled by settings in the BIOS. See **Section 6.3.4.1: SMART FAN Control Configuration**.

2.6 Environmental and Power Specifications

2.6.1 System Monitoring

Three thermal inputs on the SPCIE-3600AM2 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- CPU temperature
- System temperature

Five voltage inputs on the SPCIE-3600AM2 Super I/O Enhanced Hardware Monitor monitors the following voltages:

- Vcore
- DDR2
- DDR2_IO
- +5.0 V
- +12 V
- 3VSB
- VBA

The SPCIE-3600AM2 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- System Fan speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu. The system fan speeds can also be controlled in the BIOS.

2.6.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the SPCIE-3600AM2 are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the system chipset to ensure the operating temperature of these chips remain low.

2.6.3 Power Consumption

Table 2-2 shows the power consumption parameters for the SPCIE-3600AM2 running 3D Mark® 2001 SE with a AMD Sempron™ 3600+ processor and one 1 GB 667 MHz DDR2 SDRAM DIMM.

Voltage	Current
3.3 V	4.83 A
5.0 V	2.53 A
5.0 VSB	0.45 A
12.0 V	0.2 A
Vcore	5.98 A

Table 2-2: Power Consumption

2.7 Expansion Options

2.7.1 Expansion Options Overview

A number of compatible IEI Technology Corp. PICMG 1.3 backplanes and chassis can be used to develop and expanded system. These backplanes and chassis are listed below.

2.7.2 IEI Expansion PICMG 1.3 Backplanes

The backplanes listed in **Table 2-3** are compatible with the SPCIE-3600AM2 and can be used to develop highly integrated industrial applications. All of the backplanes listed below have 24-pin ATX connector and a 4-pin ATX connector. For more information about these backplanes please consult the IEI catalog or contact your vendor, reseller or the IEI sales team at sales@iei.com.tw.

NOTE:

All the PCIe x16 slots in the **Table 2-3** only have PCIe x8 signals transmitted to them and **NOT** PCIe x16 signals.

Model	Total Slots	System	Expansion Slots					System Type
			PCIe			PCI-X	PCI	
			x8	x4	x1			
SPE-4S	4	One	2	1	-	-	-	Single
SPE-6S	6	One	-	5	-	-	-	Single
SPE-9S	9	One	2	3	-	-	3	Single
SPXE-9S	9	One	2	2	-	2	2	Single
SPXE-14S	14	One	1	-	12	-	-	Single

Table 2-3: Compatible IEI PICMG 1.3 Backplanes

The SPE-9S backplane and the SPXE-9S backplane both support 28 PCIe lanes. Therefore, the optional (separately purchased) PCIe x8 board-to-board connector (X8-PCIE-CB-R1) shown below must be connected to the PCIe x8 connector on the SPCIE-3600AM2 and the corresponding PCIe x8 connector on the backplane.

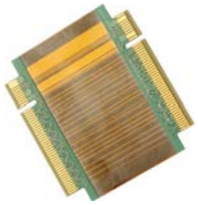


Figure 2-16: PCIe x8 board-to-board connector

2.7.3 IEI Chassis

IEI chassis available for SPCIE-3600AM2 system development are listed in **Table 2-4**. For more information about these chassis please consult the IEI catalog or contact your vendor, reseller or the IEI sales team at sales@iei.com.tw.

Model	Slot SBC	Mounting	Max Slots	Backplanes
PAC-106G-R20	Full-size	Wall	6	SPE-4S SPE-6S
PAC-107G-R20	Full-size	Wall	6	SPE-4S SPE-6S
RACK-305G-R20	Full-size (4U)	Rack	14	SPXE-14S
RACK-360G-R20	Full-size (4U)	Rack	14	SPXE-14S
RACK-814G-R20	Full-size (4U)	Rack	14	SPXE-14S
RACK-3000G-R20	Full-size (4U)	Rack	14	SPXE-14S
PAC-125G-R20	Full-size	Wall	10	SPE-9S SPXE-9S
PAC-1000G-R20	Full-size	Wall	6	SPE-4S SPE-6S
PACO-506F	Full-size	Wall	6	SPE-4S SPE-6S

Table 2-4: Compatible IEI Chassis

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the SPCIE-3600AM2 may result in permanent damage to the SPCIE-3600AM2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the SPCIE-3600AM2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the SPCIE-3600AM2, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the SPCIE-3600AM2, place it on an antic-static pad. This reduces the possibility of ESD damaging the SPCIE-3600AM2.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the SPCIE-3600AM2 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the SPCIE-3600AM2 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

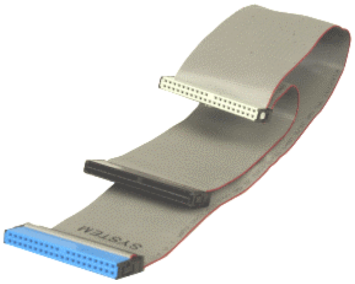
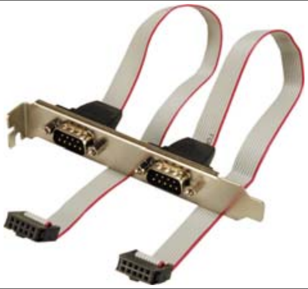
3.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the SPCIE-3600AM2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The SPCIE-3600AM2 is shipped with the following components:

Quantity	Item and Part Number	Image
1	SPCIE-3600AM2	
1	ATA 66/100 flat cable (P/N: 32200-000052-RS)	
1	Dual RS-232 cable (P/N: 19800-000051-RS)	

6	SATA cables (P/N: 32000-062800-RS)	
3	SATA power cables (P/N: 32100-088600-RS)	
1	Mini jumper Pack	
1	Quick Installation Guide	
1	Utility CD	
1	USB cable (P/N:CB-USB02-RS)	

Table 3-1: Package List Contents

3.4 Optional Items

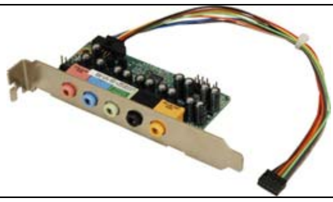
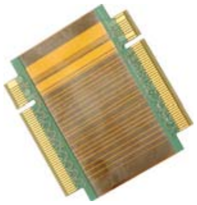
Audio kit (P/N: AC-KIT-833HD-R10)	
CPU cooler (**P/N**: CF-519-RS)	
CPU cooler (**P/N**: CF-AM2-RS)	
PCIe x8 board-to-board connector (**P/N**: X8-PCIE-CB-R1)	
PS2 cable for KB and MS (**P/N**: 19800-000066-RS)	
Winbond TPM module (**P/N**: TPM-WI01-R10)	
Infineon TPM module (**P/N**: TPM-IN01-R10)	

Table 3-2: Package List Contents

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Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section **4.1.2** shows peripheral interface connector locations. Section **4.1.2** lists all the peripheral interface connectors seen in Section **4.1.2**.

4.1.1 SPCIE-3600AM2 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

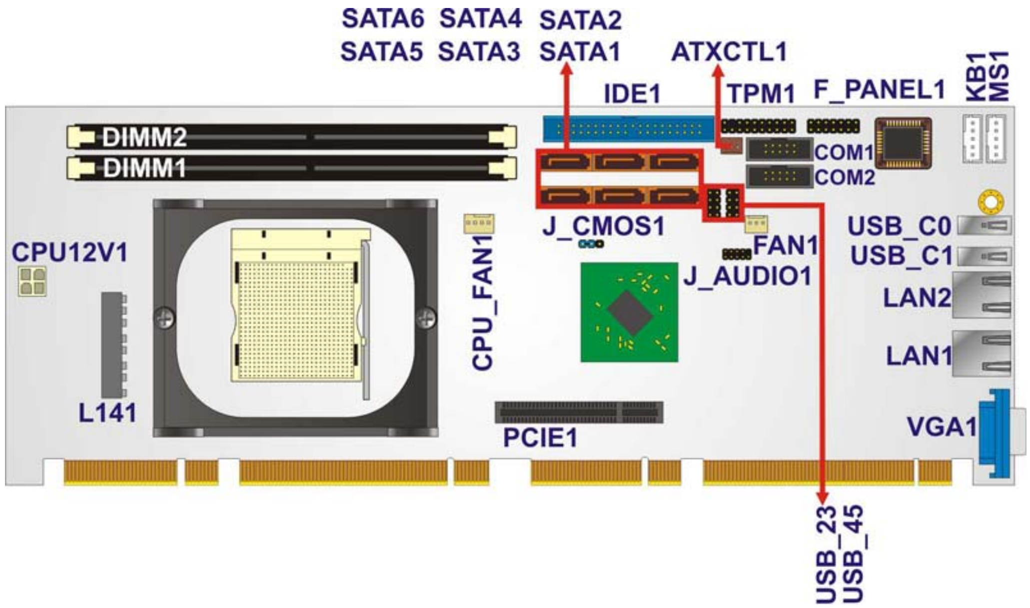


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the SPCIE-3600AM2. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power supply enable connector	3-pin wafer	ATXCTL1
Audio connector	10-pin header	J_AUDIO1
Cooling fan connector, CPU	4-pin wafer	CPU_FAN1
Front panel connector	10-pin header	F_PANEL1

IDE Interface connector	40-pin box header	IDE1
Keyboard connector	5-pin wafer	KB1
Mouse connector	5-pin wafer	MS1
Serial ATA drive connector	7-pin SATA	SATA1
Serial ATA drive connector	7-pin SATA	SATA2
Serial ATA drive connector	7-pin SATA	SATA3
Serial ATA drive connector	7-pin SATA	SATA4
Serial ATA drive connector	7-pin SATA	SATA5
Serial ATA drive connector	7-pin SATA	SATA6
Serial port connector (COM1)	10-pin box header	COM1
Serial port connector (COM2)	10-pin box header	COM2
TPM connector	20-pin header	TPM1
USB connectors	8-pin header	USB23
USB connectors	8-pin header	USB45

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the SPCIE-3600AM2. Detailed descriptions of these connectors can be found in **Section 4.3** on **page 60**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
USB port connector	USB port	USB_C0
USB port connector	USB port	USB_C1
VGA connector	DB-15 (female)	VGA1

Table 4-2: Rear Panel Connectors

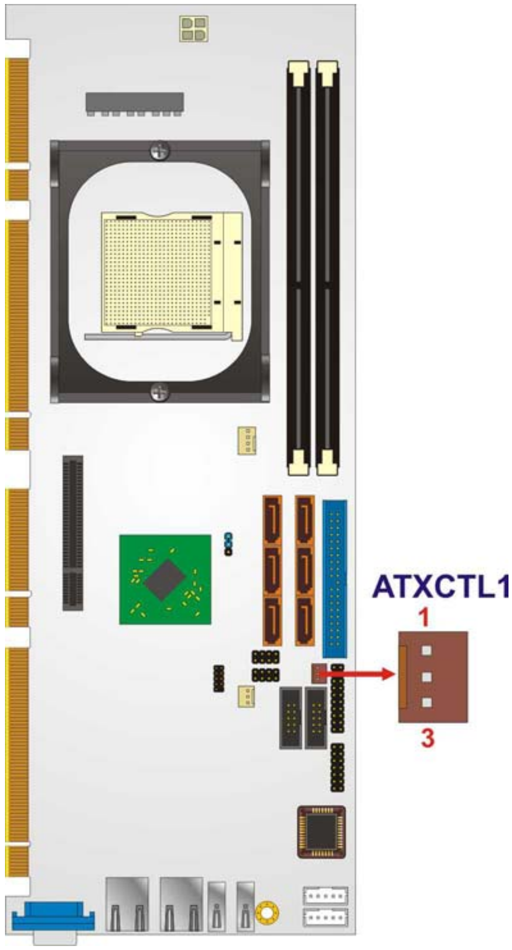
4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the SPCIE-3600AM2.

4.2.1 ATX Power Supply Enable Connector

CN Label:	ATXCTL1
CN Type:	3-pin wafer (1x3)
CN Location:	See **Figure 4-2**
CN Pinouts:	See **Table 4-3**

The ATX power supply enable connector enables the SPCIE-3600AM2 to be connected to an ATX power supply. In default mode, the SPCIE-3600AM2 can only us an AT power supply.



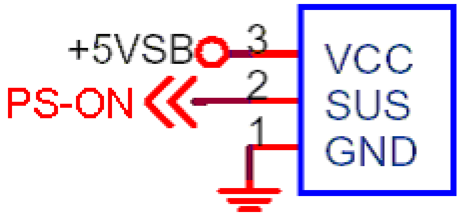


Figure 4-2: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS-ON
3	+5V Standby

Table 4-3: ATX Power Supply Enable Connector Pinouts

4.2.2 Audio Connector

CN Label: J_AUDIO1

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-3**

CN Pinouts: See **Table 4-4**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

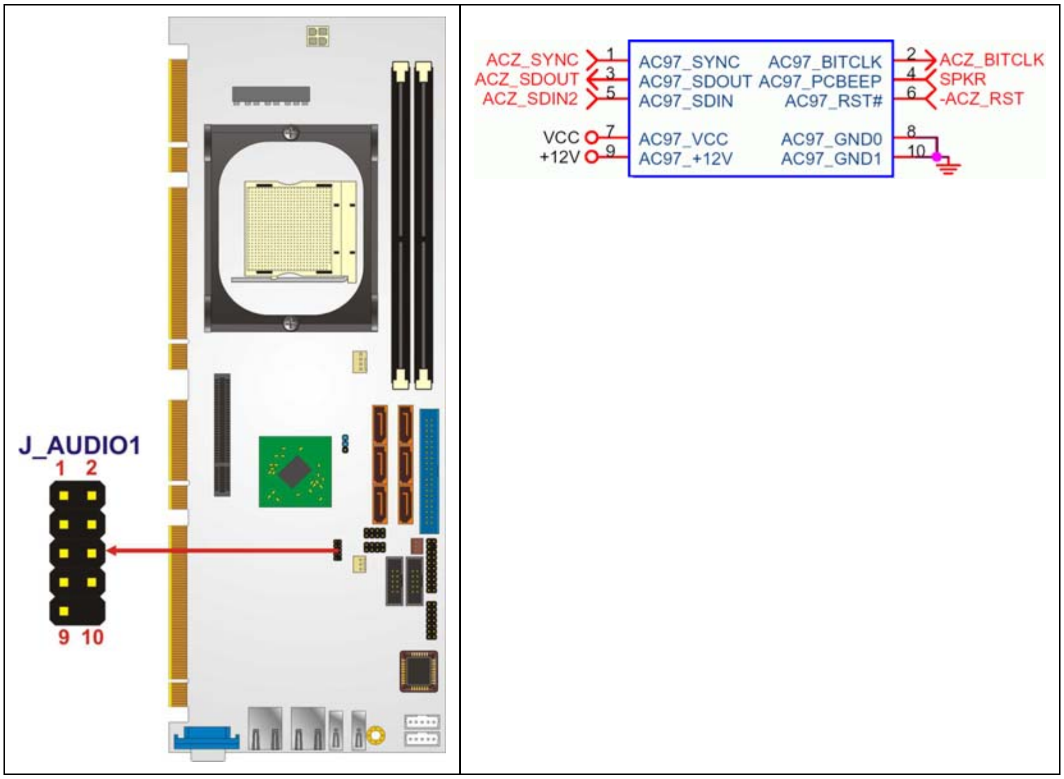


Figure 4-3: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12V	10	GND

Table 4-4: Audio Connector Pinouts

4.2.3 Cooling Fan Connector (+12V, 4-pin)

CN Label: CPU_FAN1

CN Type: 3-pin header

CN Location: See **Figure 4-4**

CN Pinouts: See **Table 4-5**

The CPU cooling fan connector provides a 12V, 500mA current to a CPU cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

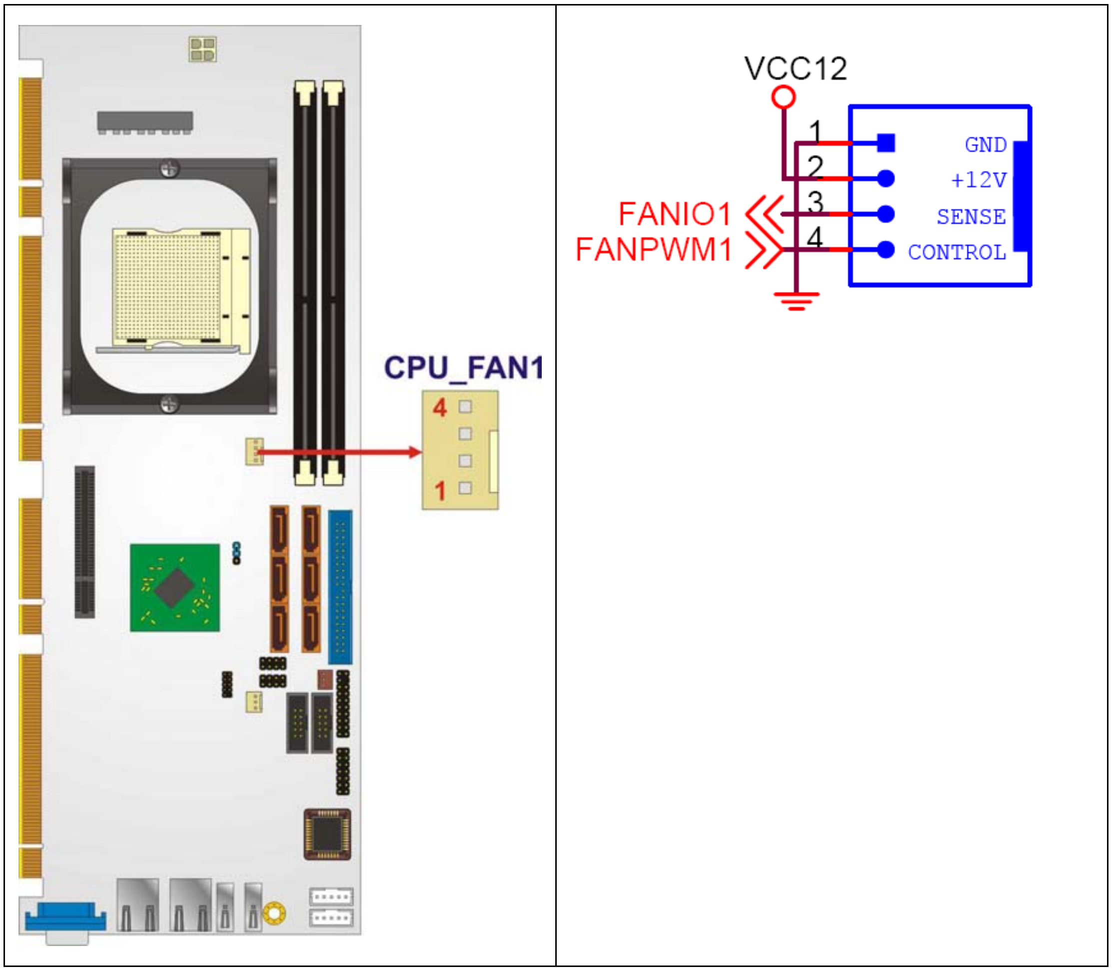


Figure 4-4: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12VCC
3	Rotation Signal
4	Control

Table 4-5: +12V Fan Connector Pinouts

4.2.4 Fan Connector (+12V, 3-pin)

CN Label: **FAN1**

CN Type: 3-pin header

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-6**

The system cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

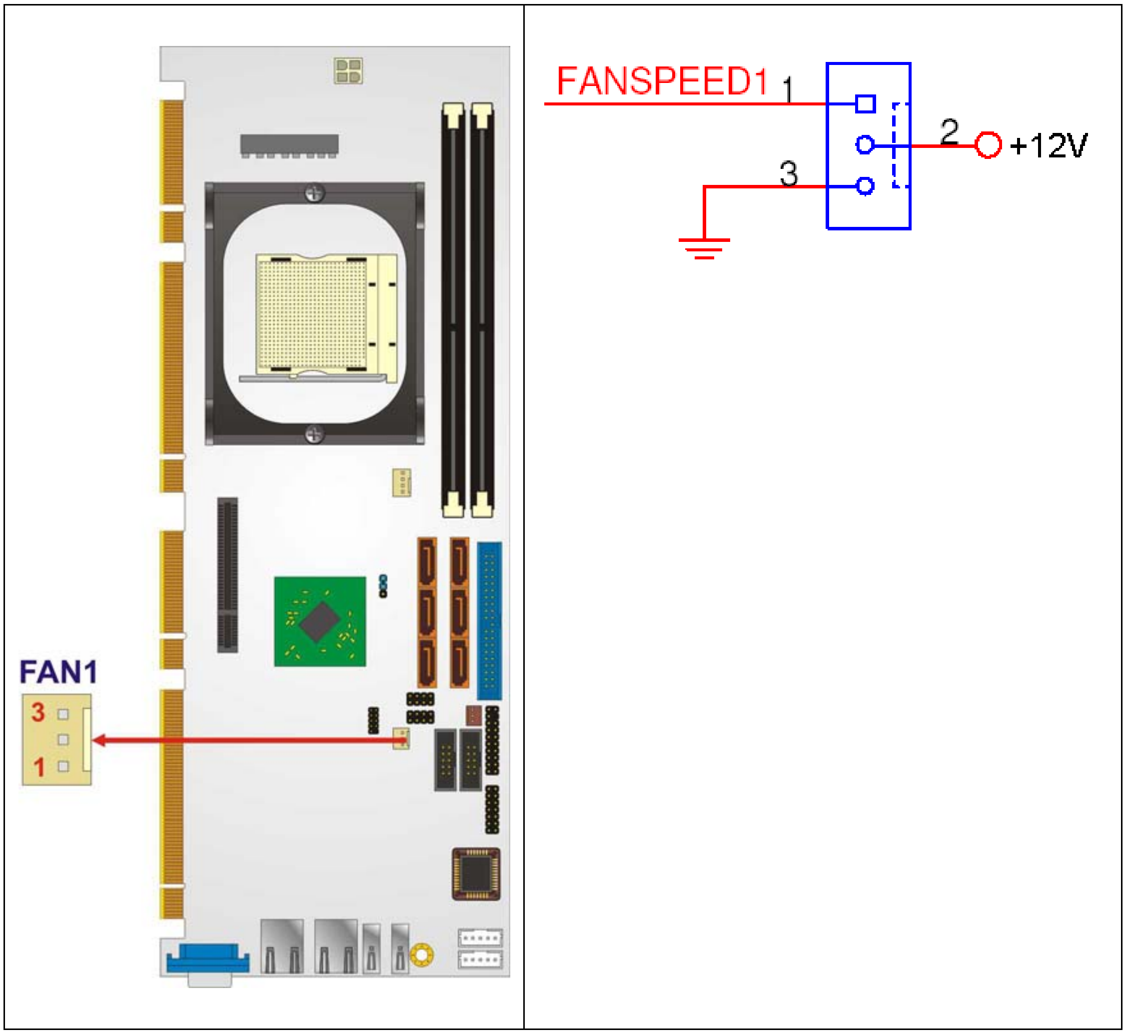


Figure 4-5: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 4-6: +12V Fan Connector Pinouts

4.2.5 Front Panel Connector (14-pin)

CN Label: F_PANEL1

CN Type: 12-pin header (2x6)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-7**

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power LED
- Speaker
- Power button
- Reset
- HDD LED

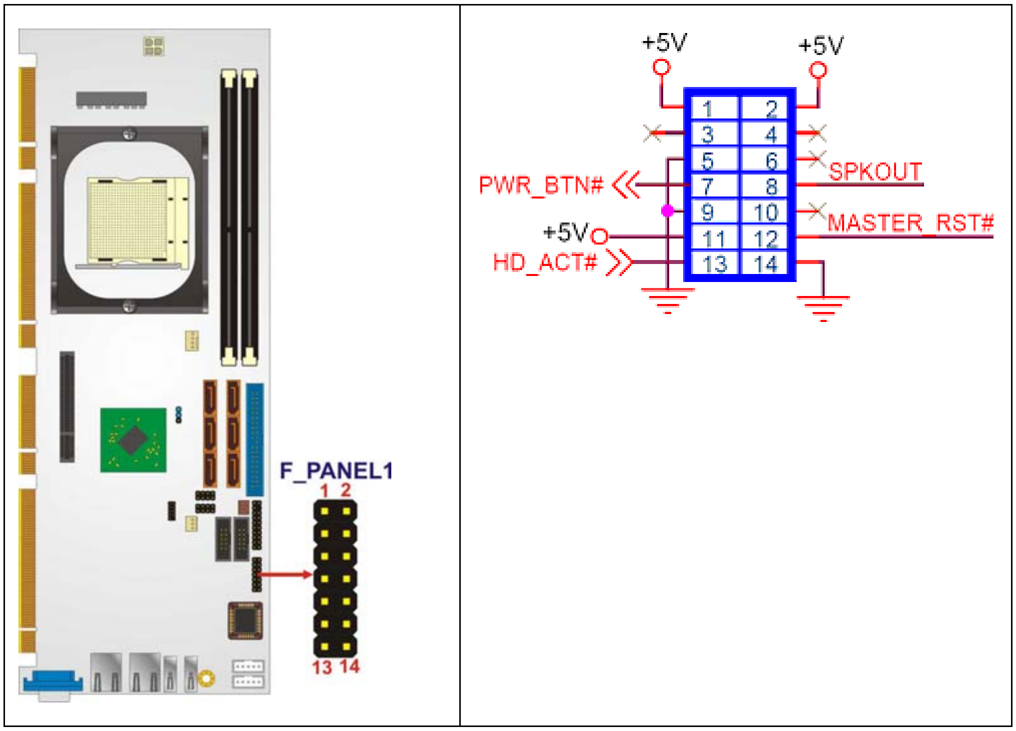


Figure 4-6: Front Panel Connector Pinout Locations (14-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	VCC	Speaker	2	VCC
	3	N/C		4	N/C
	5	GND		6	N/C
Power Button	7	PWRBTSW+		8	SPEAKER
	9	PWRBTSW-	Reset	10	N/C
HDD LED	11	VCC		12	RESET-
	13	IDE LED-		14	GND

Table 4-7: Front Panel Connector Pinouts (14-pin)

4.2.6 IDE Connector (40-pin)

CN Label: IDE1

CN Type: 40-pin header (2x20)

CN Location: See **Figure 4-7**

CN Pinouts: See **Table 4-8**

One 40-pin IDE device connector on the SPCIE-3600AM2 supports connectivity to two hard disk drives.

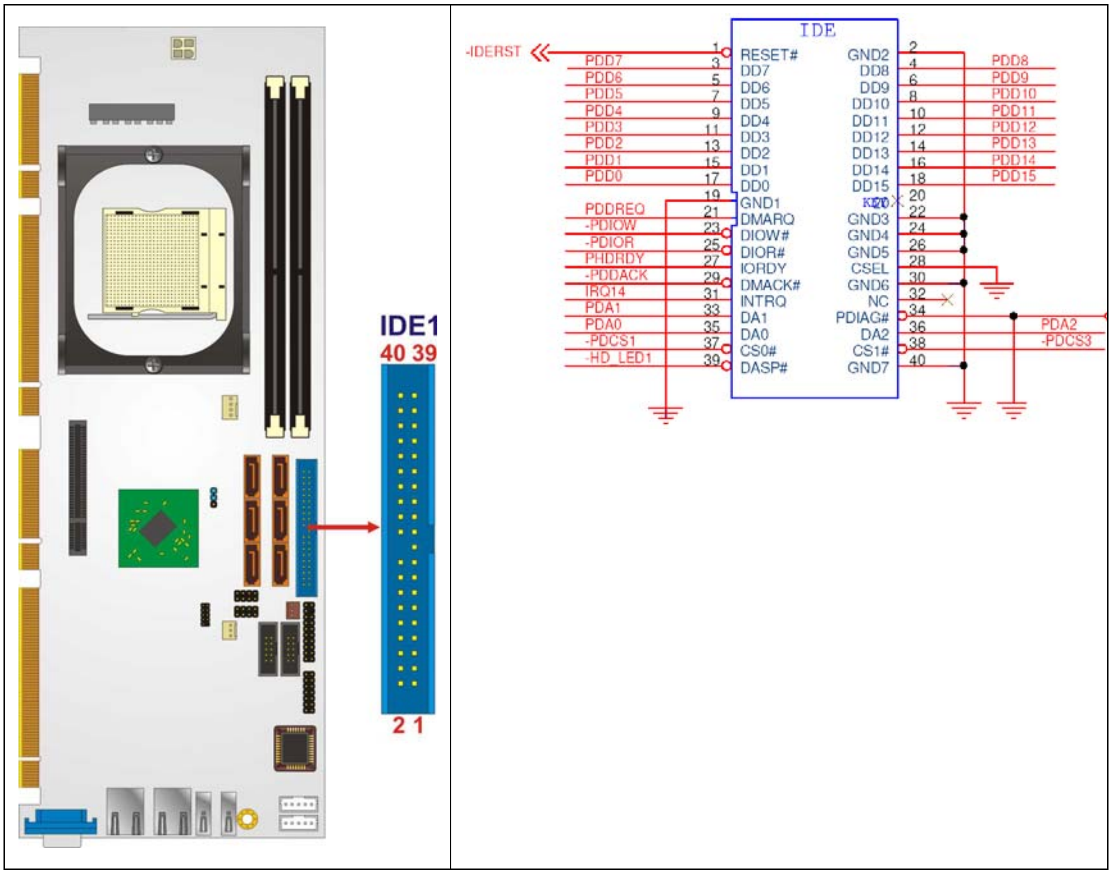


Figure 4-7: IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND

25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 4-8: IDE Connector Pinouts

4.2.7 Keyboard Connector

CN Label: KB1

CN Type: 5-pin header (1x5)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-9**

The keyboard connector can be connected to a standard PS/2 cable or PS/2 cable to add keyboard and mouse functionality to the system.

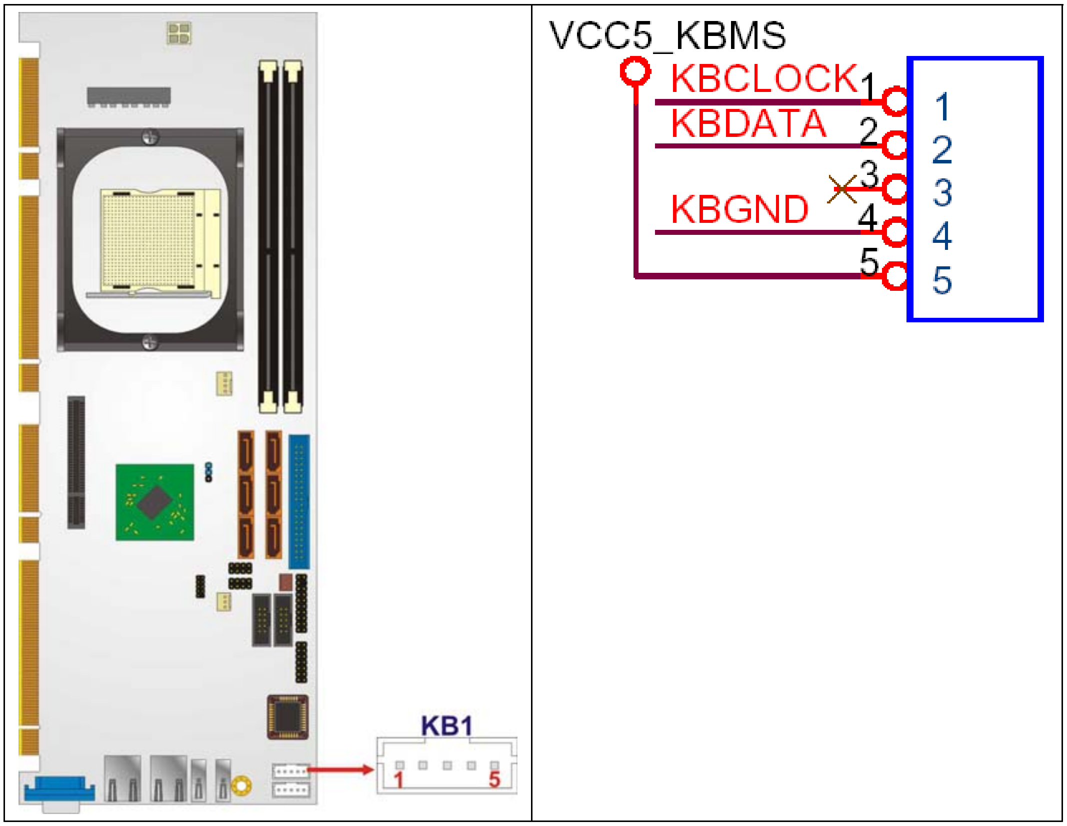


Figure 4-8: Keyboard Connector Location

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	VCC

Table 4-9: Keyboard Connector Pinouts

4.2.8 Mouse Connector

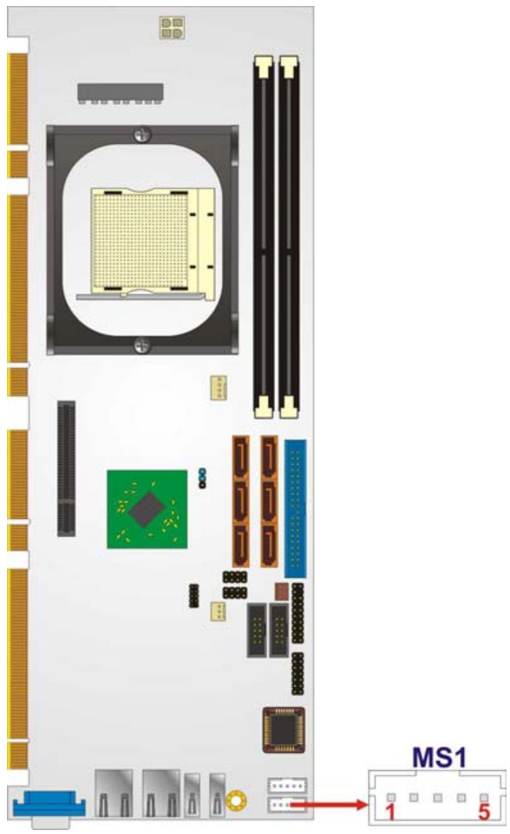
CN Label: MS1

CN Type: 5-pin header (1x5)

CN Location: See Figure 4-9

CN Pinouts: See Table 4-10

The mouse connector can be connected to a standard PS/2 cable or PS/2 cable to add keyboard and mouse functionality to the system.



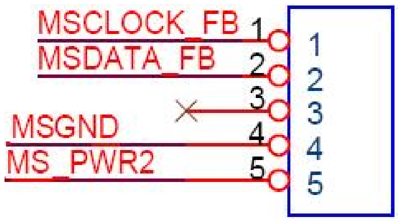


Figure 4-9: Mouse Connector Location

PIN NO.	DESCRIPTION
1	MOUSE CLOCK
2	MOUSE DATA
3	N/C
4	GROUND
5	VCC

Table 4-10: Mouse Connector Pinouts

4.2.9 SATA Drive Connectors

CN Label: SATA1, SATA2, SATA3, SATA4, SATA5 and SATA6

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-11**

The two SATA drive connectors are each connected to a first generation SATA drive. First generation SATA drives transfer data at speeds as high as 150Mb/s. The SATA drives can be configured in a RAID configuration.

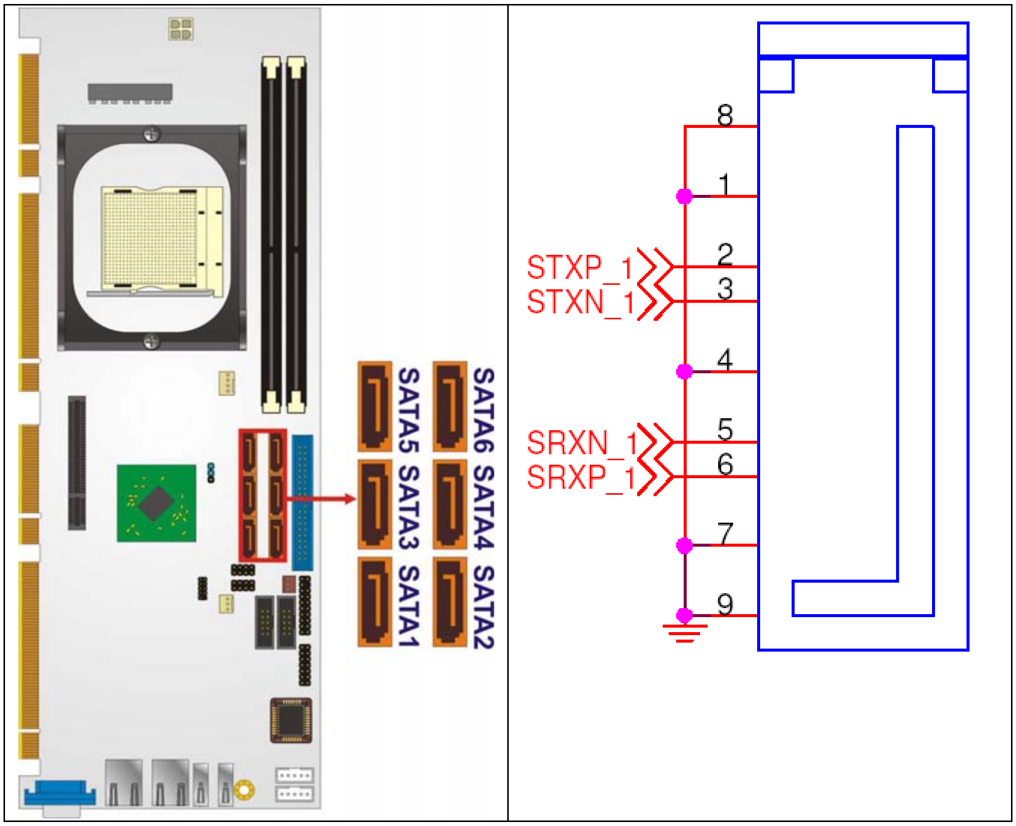


Figure 4-10: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND

2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 4-11: SATA Drive Connector Pinouts

4.2.10 Serial Port Connector (COM1, COM 2)

CN Label: COM1 and COM2

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-12**

The 10-pin serial port connector provides a second RS-232 serial communications channel. The COM 2 serial port connector can be connected to external RS-232 serial port devices.

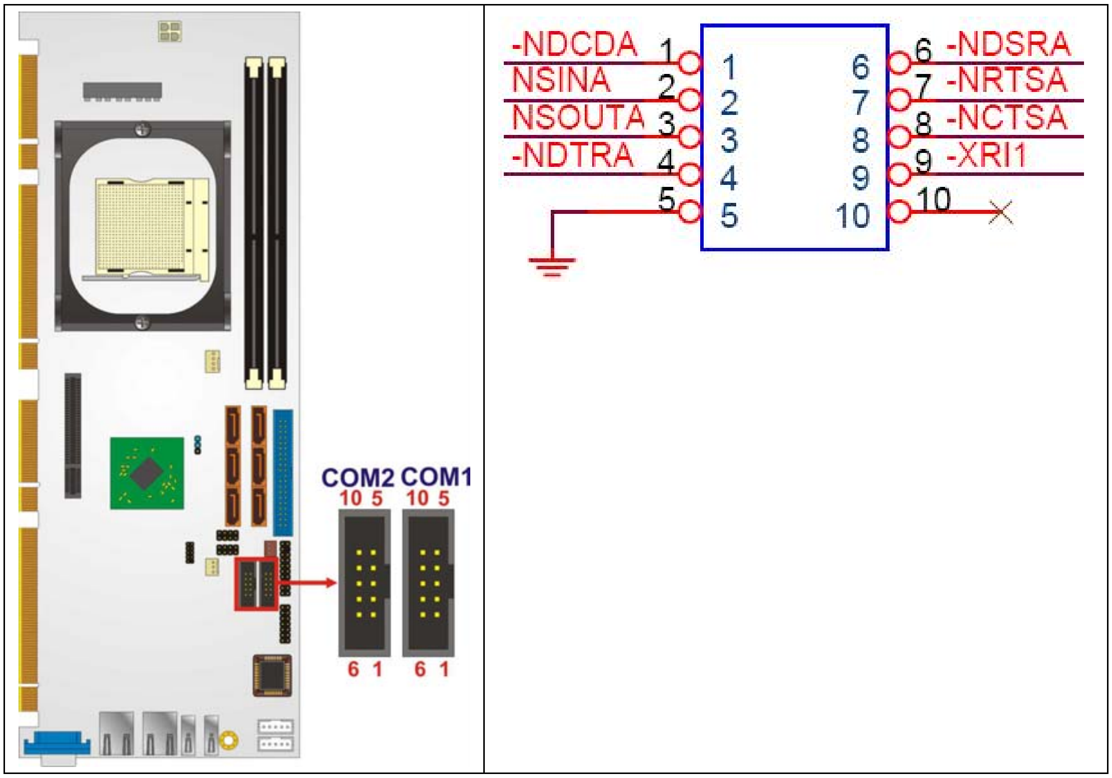


Figure 4-11: Serial Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Receive Data (RXD)
3	Transmit Data (TXD)	4	Data Terminal Ready (DTR)
5	Ground (GND)	6	Data Set Ready (DSR)
7	Request To Send (RTS)	8	Clear to Send (CTS)
9	Ring Indicator (RI)	10	N/C

Table 4-12: Serial Connector Pinouts

4.2.11 Trusted Platform Module (TPM) Connector

CN Label: TPM1

CN Type: 40-pin header (2x20)

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-13**

The Trusted Platform Module (TPM) connector secures the system on bootup. An optional TPM (see packing list in **Chapter 3**) can be connected to the TPM connector.

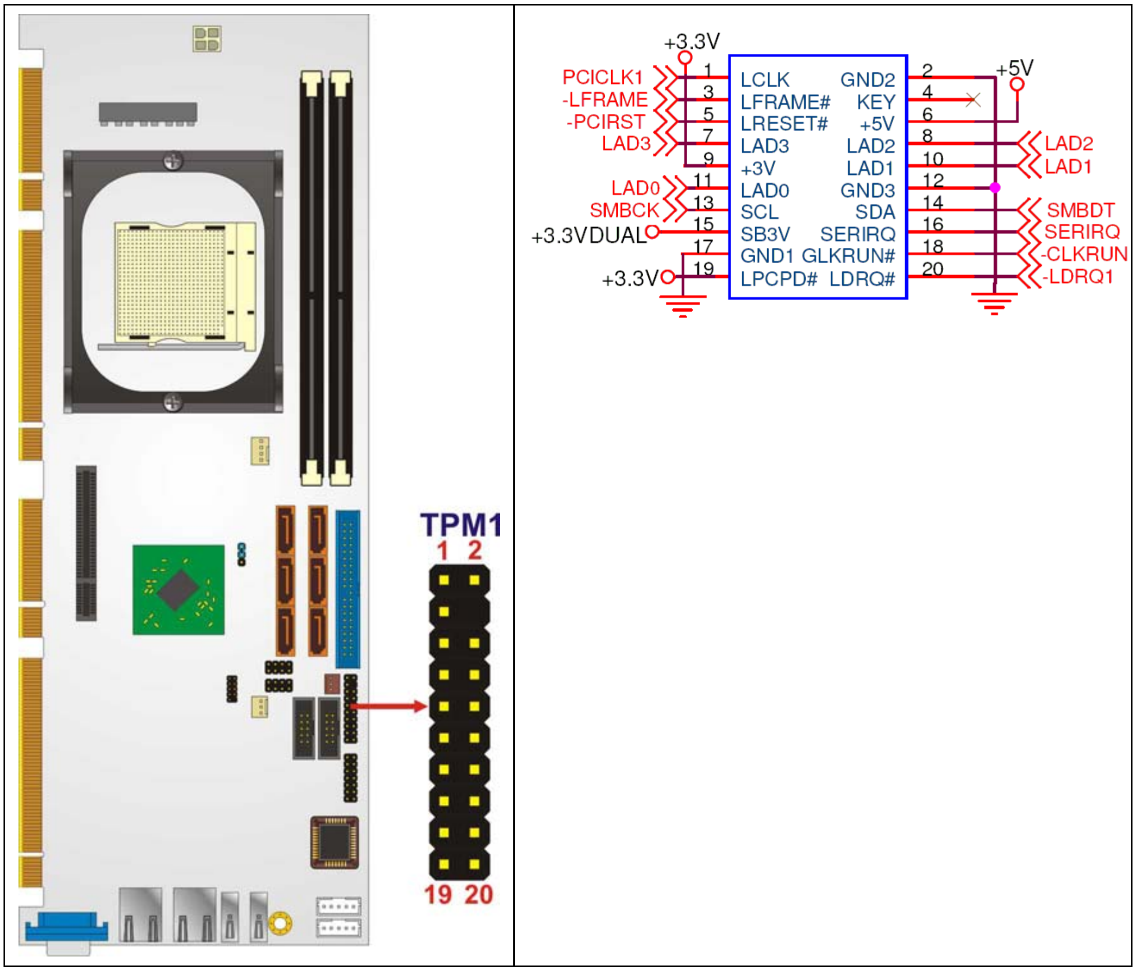


Figure 4-12: TPM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND2
3	LFRAME#	4	KEY
5	LRESET#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND3
13	SCL	14	SDA

15	SB3V	16	SERIRQ
17	GND1	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 4-13: TPM Connector Pinouts

4.2.12 USB Connectors (Internal)

CN Label: USB23 and USB45

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-13**

CN Pinouts: See **Table 4-14**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices.. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

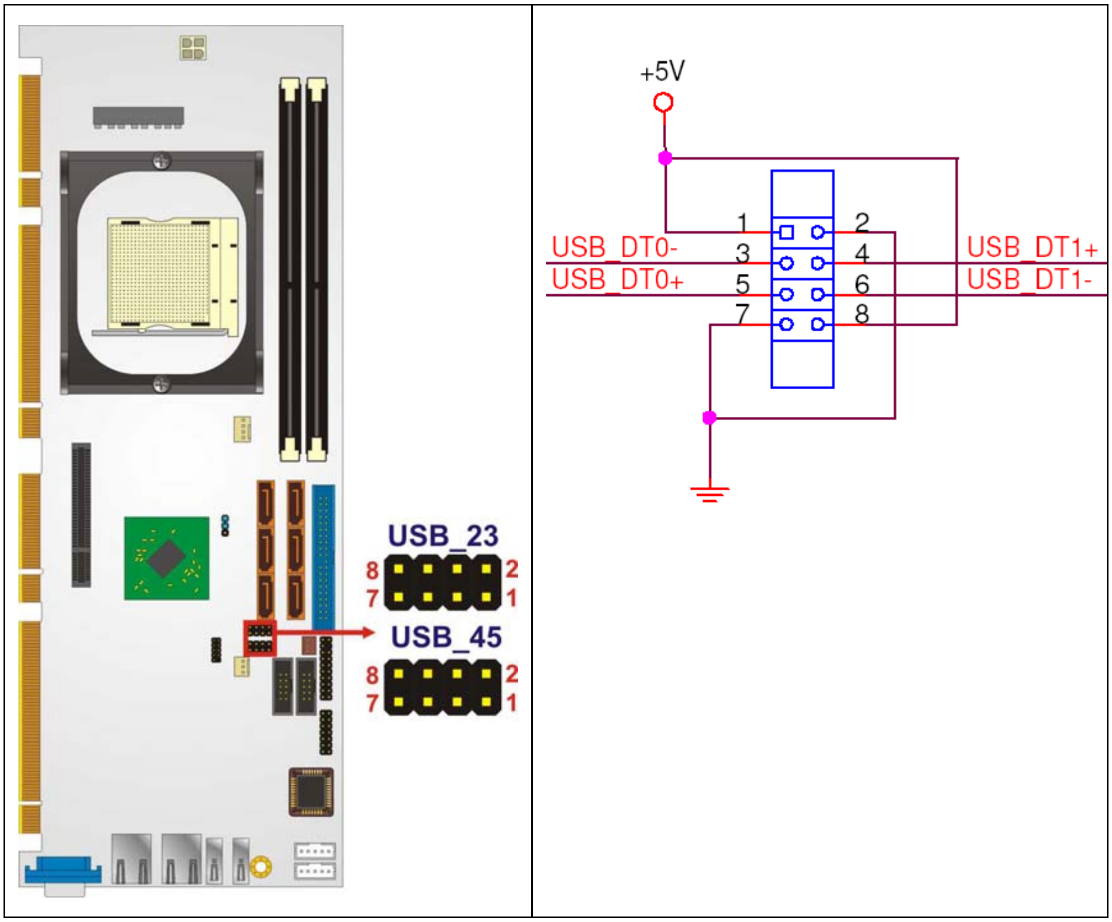


Figure 4-13: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATAN-	4	DATAM+
5	DATAN+	6	DATAM-
7	GND	8	VCC

Table 4-14: USB Port Connector Pinouts

4.3 External Peripheral Interface Connector Panel

Figure 4-14 shows the SPCIE-3600AM2 external peripheral interface connector (EPIC) panel. The SPCIE-3600AM2 EPIC panel consists of the following:

- 2 x RJ-45 LAN connectors
- 2 x USB connectors
- 1 x VGA connector

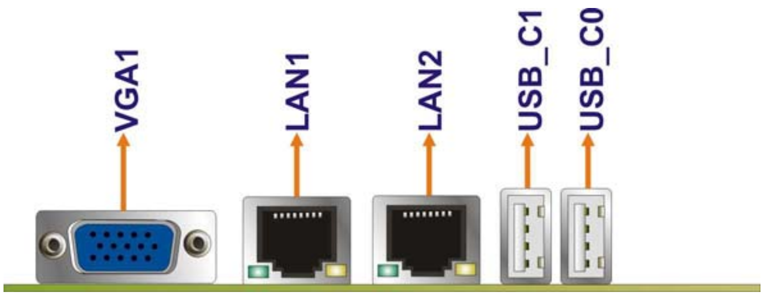


Figure 4-14: SPCIE-3600AM2 External Peripheral Interface Connector

4.3.1 LAN Connectors

CN Label:	LAN1 and LAN2
CN Type:	RJ-45
CN Location:	See **Figure 4-14**
CN Pinouts:	See **Table 4-15**

The SPCIE-3600AM2 is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 4-15: LAN Pinouts

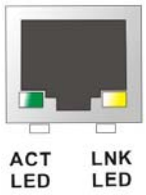


Figure 4-15: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-16**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
ORANGE	10/100 LAN	YELLOW	Linked
GREEN	GbE LAN		

Table 4-16: RJ-45 Ethernet Connector LEDs

4.3.2 USB Connector

CN Label: USB_C0 and USB_C1

CN Type: USB port

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-17**

The SPCIE-3600AM2 has four external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	USB0N
3	USB0P	4	GND
5	GND	6	GND
7	GND	8	GND

Table 4-17: USB Port Pinouts

4.3.3 VGA Connector

CN Label: VGA1

CN Type: 15-pin Female

CN Location: See **Figure 4-14**

CN Pinouts: See Figure 4-16 and Table 4-18

The SPCIE-3600AM2 has a single 15-pin female connector for connectivity to standard display devices.

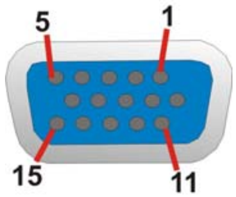


Figure 4-16: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT

PIN	DESCRIPTION	PIN	DESCRIPTION
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 4-18: VGA Connector Pinouts

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Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the SPCIE-3600AM2 may result in permanent damage to the SPCIE-3600AM2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the SPCIE-3600AM2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the SPCIE-3600AM2, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the SPCIE-3600AM2, place it on an antic-static pad. This reduces the possibility of ESD damaging the SPCIE-3600AM2.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the SPCIE-3600AM2 is installed. All installation notices pertaining to the installation of the SPCIE-3600AM2 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the SPCIE-3600AM2 and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the SPCIE-3600AM2, SPCIE-3600AM2 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - o The user manual provides a complete description of the SPCIE-3600AM2 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the SPCIE-3600AM2 on an antistatic pad:
  - o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the SPCIE-3600AM2 off:

  - When working with the SPCIE-3600AM2, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the SPCIE-3600AM2 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the SPCIE-3600AM2 is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The jumpers have been properly configured
- The SPCIE-3600AM2 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary and secondary IDE device
  - SATA drives
  - Keyboard and mouse cable
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - LAN

- o USB devices

5.3 Unpacking

5.3.1 Unpacking Precautions

When the SPCIE-3600AM2 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the SPCIE-3600AM2 does not fall out of the box.
- Make sure all the components in the checklist shown in **Chapter 3** are present.

NOTE:

If some of the components listed in the checklist in **Chapter 3** are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the SPCIE-3600AM2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

5.4 CPU, CPU Cooling Kit and DIMM Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, SPCIE-3600AM2 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the SPCIE-3600AM2. If one of these components is not installed the SPCIE-3600AM2 cannot run.

5.4.1 Socket AM2 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

To install a socket AM2 CPU onto the SPCIE-3600AM2, follow the steps below:

WARNING:

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

Step 1: Inspect the CPU socket. Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 2: Open the CPU socket lever. Disengage the load lever by moving the lever slightly outward to clear the retention tab. Rotate the load lever to a fully open position. See Figure 5-1.

Step 3: Orientate the CPU properly. Make sure the IHS (Integrated Heat Sink) side is facing upward. See Figure 5-1.

Step 4: Correctly position the CPU. Match the Pin 1 mark with the cut edge on the CPU socket. See Figure 5-1.

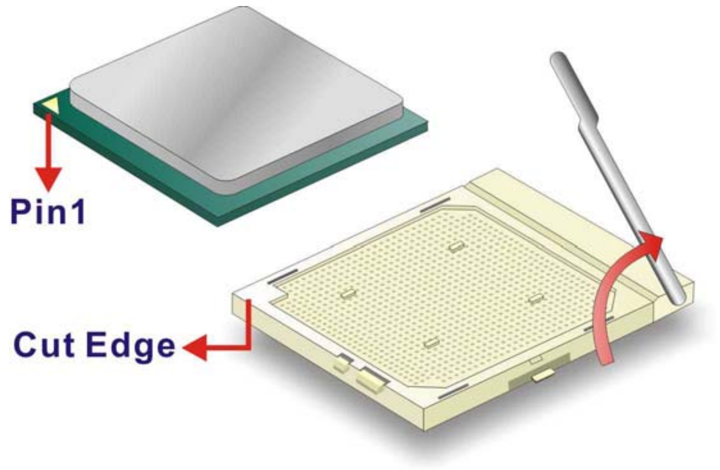


Figure 5-1: Install the CPU

Step 5: Insert the CPU. Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly

Step 6: Close the CPU socket. Re-engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

5.4.2 Socket AM2 Cooling Kit Installation

	
CF-AM2-RS	**CF-519-RS**

Figure 5-2: IEI Cooling Kit

An IEI AMD Socket AM2 CPU cooling kit (**Figure 5-2**) can be purchased separately. The cooling kit comprises a CPU heat sink and a cooling fan. To install the cooling kit, please follow the steps below.

Step 1: Spread a proper amount of thermal paste onto the bottom of the cooling fan heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

Step 2: Properly orient the cooling kit. Be sure the cooling kit is properly oriented before installing the cooling kit into the preinstalled cooling kit bracket.

Step 3: Install the cooling kit into the preinstalled cooling kit bracket. See Figure 5-3.

Step 4: Attach the levered mounting clips. Slip the four levered mounting clips into the clip holes on the cooling kit bracket. See Figure 5-3.

Step 5: Secure the cooling kit in place. Gently push the plastic mounting clip down to lock the cooling kit. See Figure 5-3.

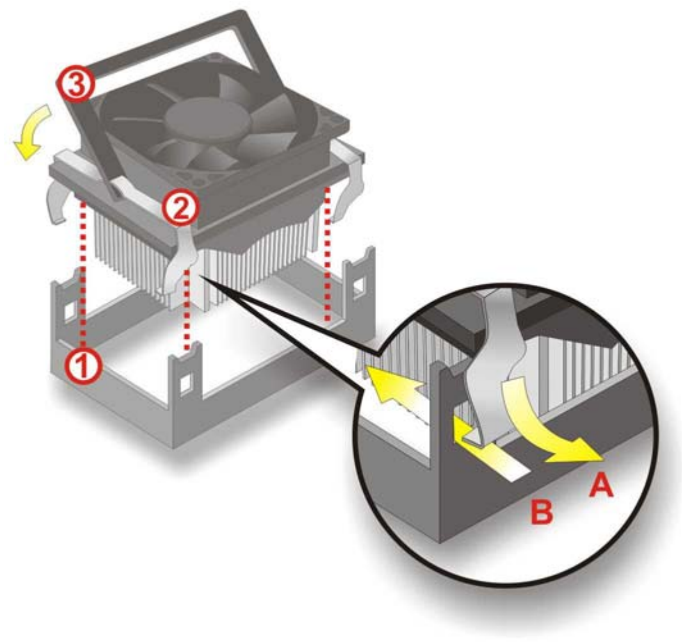


Figure 5-3: Install the CPU cooler

Step 6: Connect the fan cable. Connect the cooling kit fan cable to the fan connector on the CPU card. Carefully route the cable and avoid heat generating chips and fan blades.

5.4.3 DIMM Installation

WARNING:

Using incorrectly specified DIMM may cause permanently damage the SPCIE-3600AM2. Please make sure the purchased DIMM complies with the memory specifications of the SPCIE-3600AM2. DIMM specifications compliant with the SPCIE-3600AM2 are listed in **Chapter 2**.

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-4**.

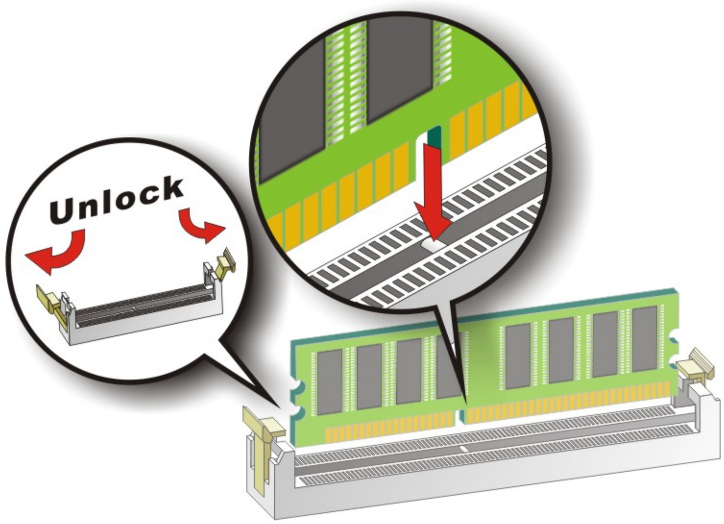


Figure 5-4: Installing a DIMM

Step 1: Open the DIMM socket handles. The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 5-4**.

Step 2: Align the DIMM with the socket. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-4**.

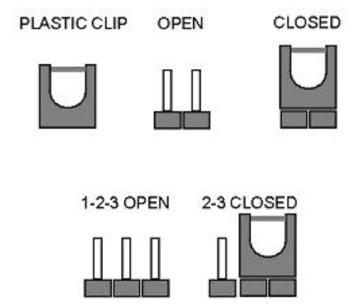
Step 3: Insert the DIMM. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-4**.

Step 4: Removing a DIMM. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Jumper

Before the SPCIE-3600AM2 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the SPCIE-3600AM2 are listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header

Table 5-1: Jumpers

5.5.1 Clear CMOS Jumper

Jumper Label: J_CMOS1

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See **Figure 5-5**

If the SPCIE-3600AM2 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the

jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

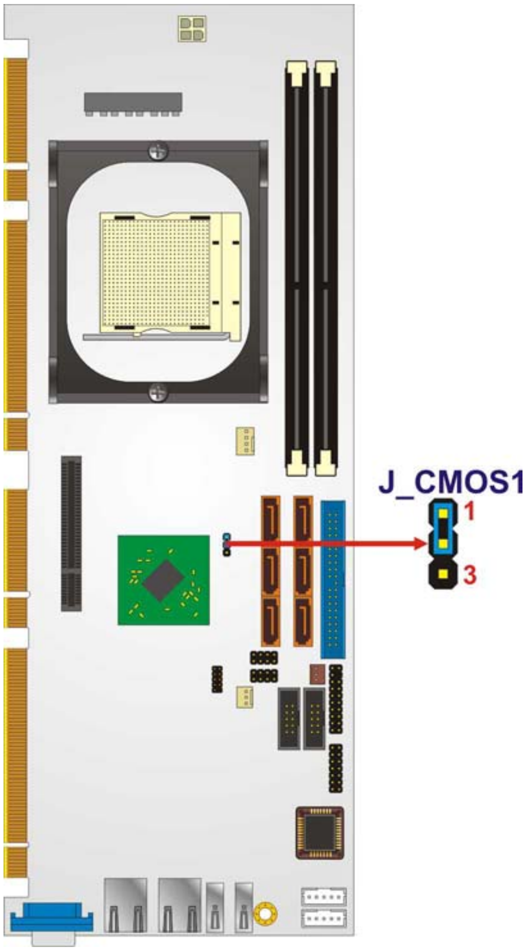
- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu. The clear CMOS jumper settings are shown in **Table 5-2**.

Jumper Select	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-2: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-5** below.



Step 1: Figure 5-5: Clear CMOS Jumper

5.6 Chassis Installation

5.6.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other on-board components. The chassis in which the SPCIE-3600AM2 must have air vents to allow cool air to move into the system and hot air to move out.

The SPCIE-3600AM2 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

NOTE:

IEI has a wide range of backplanes available. Please contact your SPCIE-3600AM2 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.6.2 Backplane Installation

Before the SPCIE-3600AM2 can be installed into the chassis, a backplane must first be installed. Please refer to the installation instructions that came with the backplane and the chassis to see how to install the backplane into the chassis.

NOTE:

IEI has a wide range of backplanes available. Please contact your SPCIE-3600AM2 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.6.3 CPU Card Installation

To install the SPCIE-3600AM2 CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-3** are shipped with the SPCIE-3600AM2.

Quantity	Type
1	ATA 66/100 flat cable
1	Dual RS-232 cable
6	SATA drive cables
3	SATA drive power cables
1	USB cable

Table 5-3: IEI Provided Cables

Separately purchased optional IEI items that can be installed are listed below:

- Audio kit
- Keyboard and mouse cable with bracket

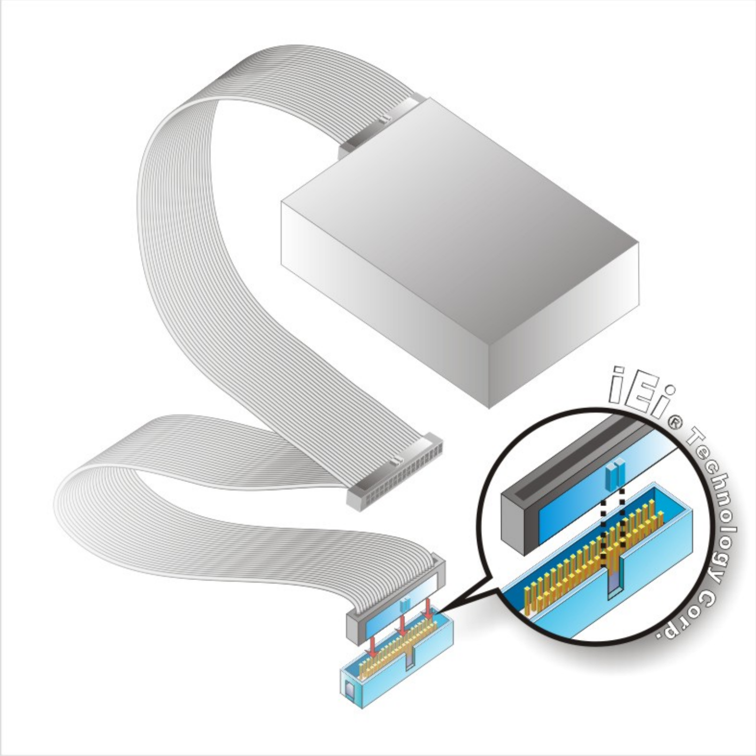
For more details about the items listed above, please refer to **Chapter 3**. Installation instructions of the accessories listed above are described in detail below.

5.7.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the SPCIE-3600AM2 to one or two IDE devices. To connect an IDE HDD to the SPCIE-3600AM2 please follow the instructions below.

Step 2: Locate the IDE connector. The location/s of the IDE device connector/s is/are shown in Chapter 3.

Step 3: Insert the connector. Connect the IDE cable connector to the on-board connector. See **Figure 5-6**. A key on the front of the cable connector ensures it can only be inserted in one direction.



Step 4: Figure 5-6: IDE Cable Connection

Step 5: Connect the cable to an IDE device. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector

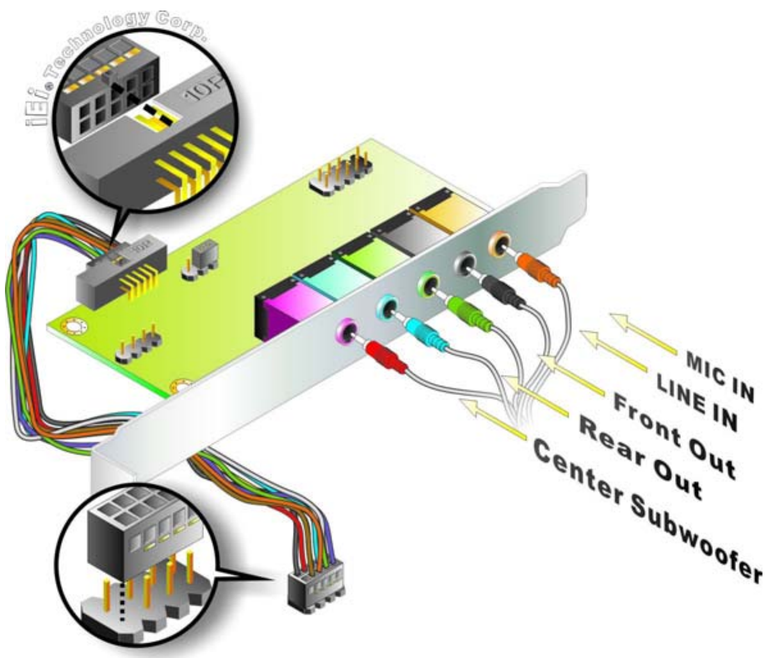
5.7.3 Audio Kit Installation

An optional audio kit that is separately ordered connects to the 9-pin audio connector on the SPCIE-3600AM2. The audio kit consists of five audio jacks. One audio jack, Mic In, connects to a microphone. The remaining four audio jacks, Front-In, Front-Out, Rear-Out and subwoofer connect to four speakers including a subwoofer. To install the audio kit, please refer to the steps below:

Step 1: Locate the audio connector. The location of the 10-pin audio connector is shown in Chapter 3.

Step 2: Align pin 1. Align pin 1 on the on-board connector with pin 1 on the audio kit

connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-7**.



Step 3: Figure 5-7: Audio Kit Connection

Step 4: Connect the audio devices. Connect the speakers and the subwoofer to the appropriate audio jack shown in **Figure 5-7**.

5.7.4 Keyboard and Mouse PS/2 Cable with Bracket

The SPCIE-3600AM2 can be shipped with an optional keyboard and mouse PS/2 cable with bracket. The keyboard and mouse PS/2 cable with bracket comprises of two PS/2 connectors installed on a bracket. Each PS/2 connector is connected via a cable to two separate female 5-pin wafer connectors. The female 5-pin wafer connectors are connected to the corresponding on-board keyboard and mouse connector. To connect the optional keyboard and mouse PS/2 cable with bracket please follow the steps below.

Step 1: Locate the connectors. The locations of the keyboard connector and the mouse connector are shown in Chapter 3.

Step 2: Align the connectors. Correctly align pin 1 on the PS/2 keyboard (mouse) cable

connector with pin 1 on the SPCIE keyboard (mouse) connector. See Figure 5-8.

Step 3: Insert the cable connectors. Once the keyboard (mouse) cable connector is properly aligned with the keyboard (mouse) connector on the SPCIE-3600AM2, connect the cable connector to the on-board connector. See Figure 5-8.

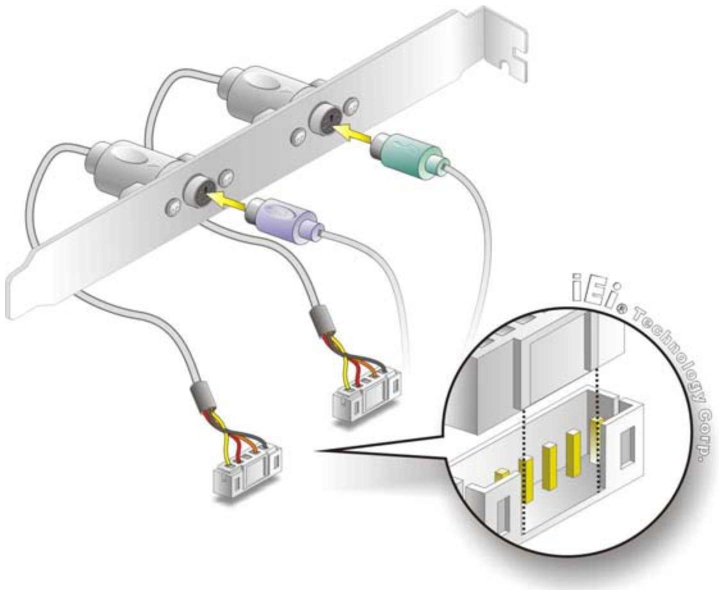


Figure 5-8: Keyboard and Mouse PS/2 Cable with Bracket

Step 4: Connect the bracket to the chassis. The bracket has a retention screw hole at the top. Properly insert the bracket into the chassis and secure the bracket to the chassis with a retention screw passing through the retention screw hole. Please see the chassis installation instructions for more details.

Step 5: Connect the keyboard and mouse. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. See Figure 5-8.The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

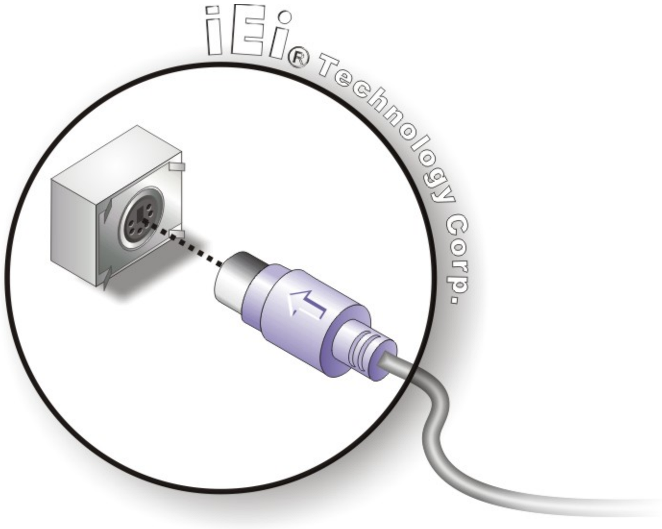


Figure 5-9: PS/2 Connector

5.7.5 Dual RS-232 Cable Connection

The dual RS-232 cable consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the dual RS-232 cable, please follow the steps below.

Step 1: Locate the connectors. The locations of the RS-232 connectors are shown in Chapter 3.

Step 2: Insert the cable connectors. Insert one connector into each serial port box headers. See **Figure 5-10**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

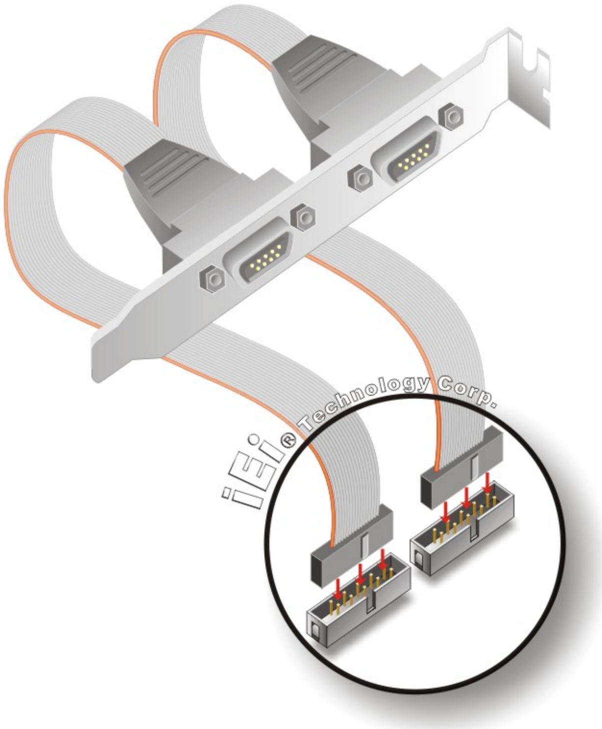


Figure 5-10: Dual RS-232 Cable Installation

Step 3: Secure the bracket. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis.

5.7.6 SATA Drive Connection

The SPCIE-3600AM2 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: Locate the connectors. The locations of the SATA drive connectors are shown in Chapter 3.

Step 2: Insert the cable connector. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 5-11**.

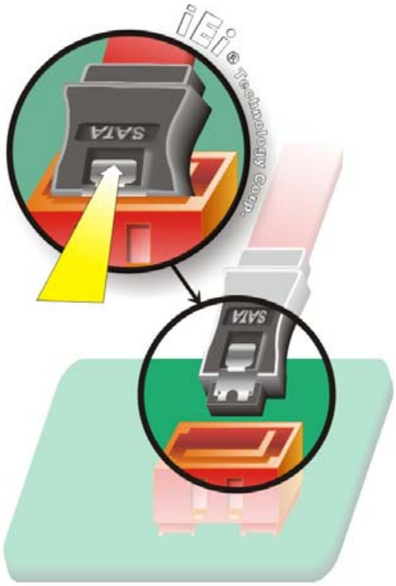


Figure 5-11: SATA Drive Cable Connection

Step 3: Connect the cable to the SATA disk. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-12**.

Step 4: Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-12**.



Figure 5-12: SATA Power Drive Connection

5.7.7 USB Cable (Dual Port)

The SPCIE-3600AM2 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: Locate the connectors. The locations of the USB connectors are shown in Chapter 3.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: Align the connectors. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the SPCIE-3600AM2 USB connector.

Step 3: Insert the cable connectors. Once the cable connectors are properly aligned with the USB connectors on the SPCIE-3600AM2, connect the cable connectors to the on-board connectors. See **Figure 5-13**.

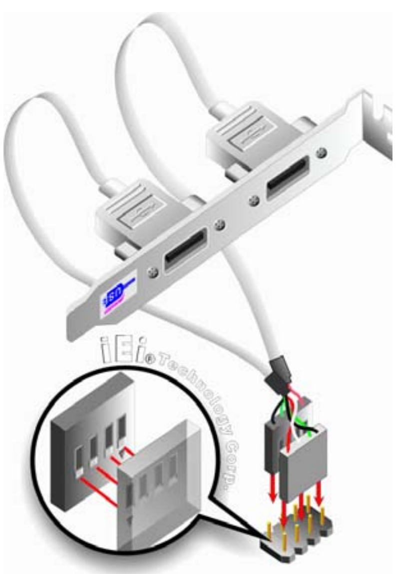


Figure 5-13: Dual USB Cable Connection

Step 4: Attach the bracket to the chassis. The USB 2.0 connectors are attached to a

bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

5.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- USB devices
- VGA connector

To install these devices, connect the corresponding cable connector from the actual device to the corresponding SPCIE-3600AM2 external peripheral interface connector making sure the pins are properly aligned.

5.8.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: Locate the RJ-45 connectors. The locations of the USB connectors are shown in Chapter 4.

Step 2: Align the connectors. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the SPCIE-3600AM2. See **Figure 5-14**.

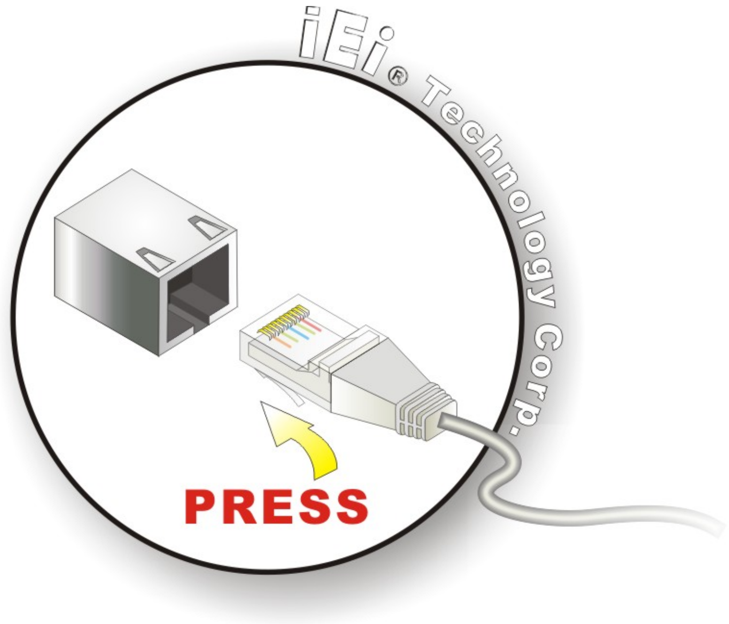


Figure 5-14: LAN Connection

Step 3: Insert the LAN cable RJ-45 connector. Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

5.8.2 USB Device Connection (Single Connector)

There are two external USB 2.0 connectors. Both connectors are perpendicular to the SPCIE-3600AM2. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

Step 1: Located the USB connectors. The locations of the USB connectors are shown in Chapter 4.

Step 2: Align the connectors. Align the USB device connector with one of the connectors on the SPCIE-3600AM2. See Figure 5-15.

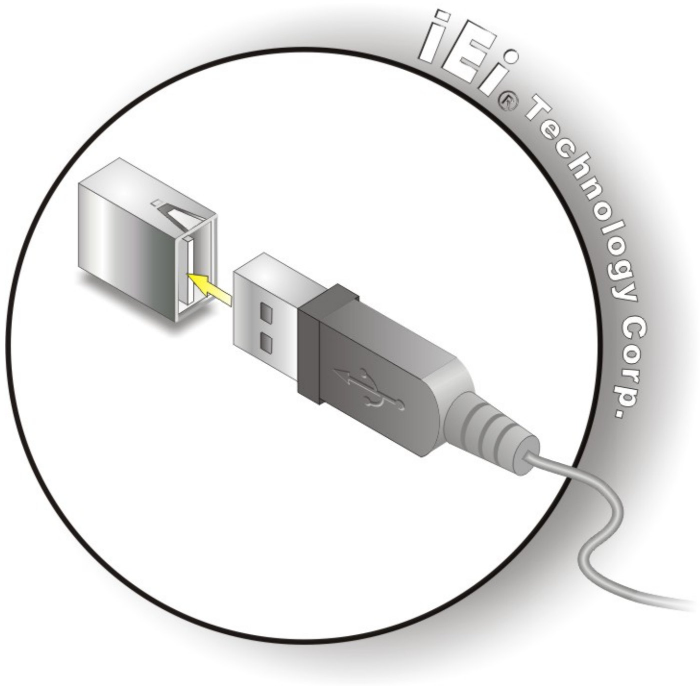


Figure 5-15: USB Device Connection

Step 3: Insert the device connector. Once aligned, gently insert the USB device connector into the on-board connector.

5.8.3 VGA Monitor Connection

The SPCIE-3600AM2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the SPCIE-3600AM2, please follow the instructions below.

Step 1: Locate the female DB-15 connector. The location of the female DB-15 connector is shown in Chapter 3.

Step 2: Align the VGA connector. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: Insert the VGA connector. Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the SPCIE-3600AM2. See **Figure 5-16**.

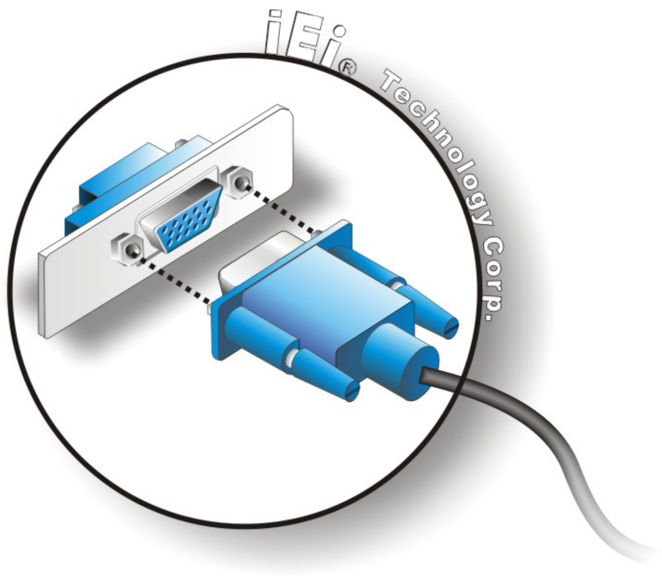


Figure 5-16: VGA Connector

Step 4: Secure the connector. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

5.9 Connecting the SPCIE-3600AM2 to the Backplane

5.9.1 Installing the SPCIE-3600AM2 onto the Backplane

The SPCIE-3600AM2 is a PICMG 1.3 form factor CPU card. To install the SPCIE-3600AM2 onto the backplane, please follow the instructions below.

Step 1: Align the edge connectors. Align the four edge connectors (labeled A, B, C and D in **Figure 5-17**) on the SPCIE-3600AM2 with the corresponding connectors on the PICMG 1.3 backplane. See **Figure 5-17**.

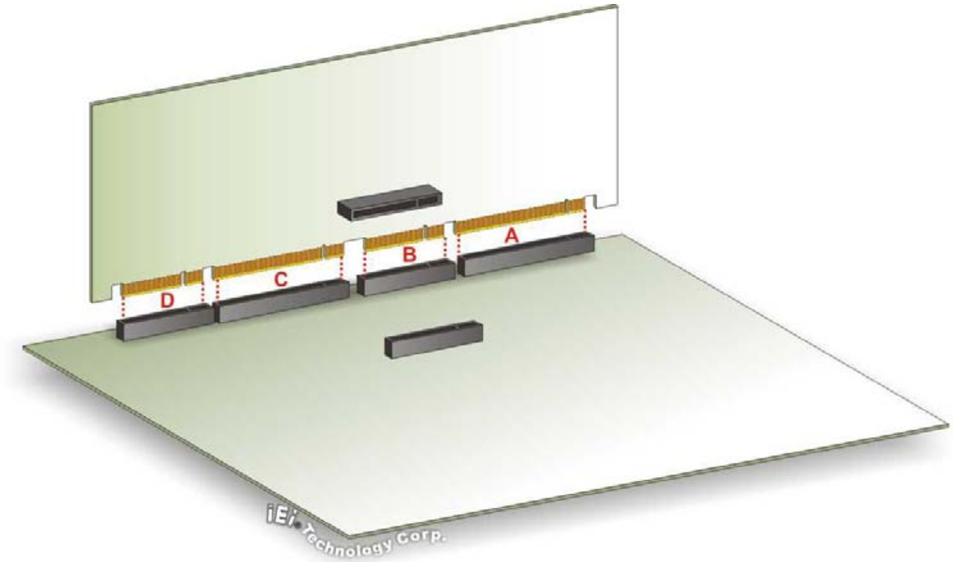


Figure 5-17: SPCIE-3600AM2 Installation

Step 2: Insert the connectors. Gently push the CPU card onto the connectors making sure the CPU card edge connectors are securely inserted into the corresponding backplane connectors.

5.9.2 Connecting the PCIe x8 Connector to the Backplane

If an IEI PICMG 1.3 server grade backplane is being used that supports more than 20 PCIe lanes, the PCIe x8 connector on the SPCIE-3600AM2 must be connected to the corresponding connector on the backplane using an optional PCIe x8 board-to-board connector. To do this, please follow the instructions below:

Step 1: Install the CPU card onto a compatible backplane. Make sure the SPCIE-3600AM2 is properly installed onto a compatible backplane. See the previous section.

Step 2: Connect the PCIe x8 connector to the backplane. Connect one side of the PCIe x8 board-to-board connector to the PCIe x8 connector on the SPCIE-3600AM2 CPU card. Connect the other side of the PCIe x8 board-to-board connector to the corresponding PCIe x8 connector on the backplane.

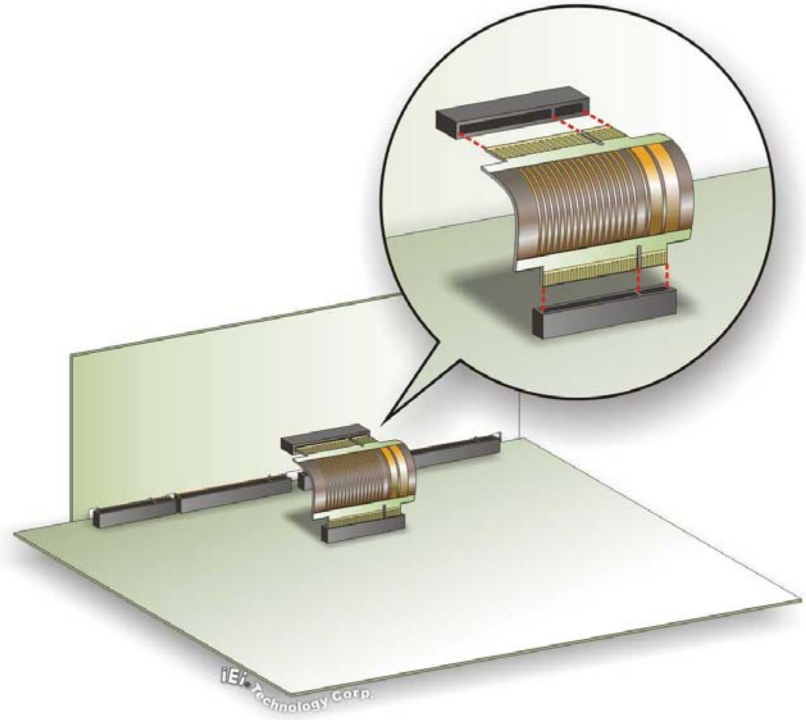


Figure 5-18: PCIe x8 Board-to-Board Connector Installation

Step 3: Secure the PCIe x8 board-to-board connector. Make sure the connection to both connectors is secure.

Chapter

6

BIOS Screens

6.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** key is pressed, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in.

Key	**Function**
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes

F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 5**.

6.1.5 BIOS Menu Bar

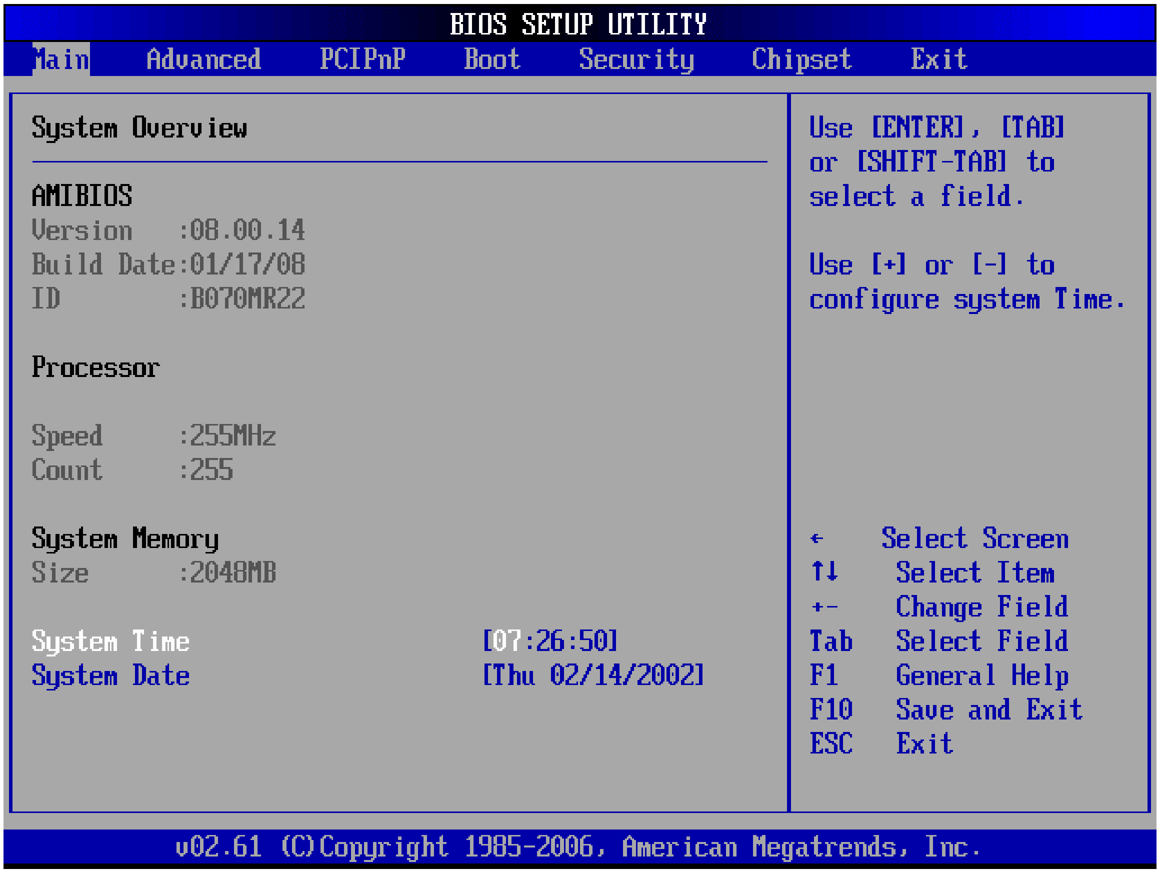
The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

6.2 Main

The Main BIOS menu (**BIOS Menu 1**) appears when the BIOS Setup program is entered. The Main menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - o **Version**: Current BIOS version
  - o **Build Date**: Date the current BIOS version was made
  - o **ID**: Installed BIOS ID

- **Processor**: Displays auto-detected CPU specifications
  - o **Type**: Names the currently installed processor
  - o **Speed**: Lists the processor speed
  - o **Count**: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - o **Size**: Lists memory size

The System Overview field also has two user configurable fields:

➔ System Time [xx:xx:xx]

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ System Date [xx/xx/xx]

Use the **System Date** option to set the system date. Manually enter the day, month and year.

6.3 Advanced

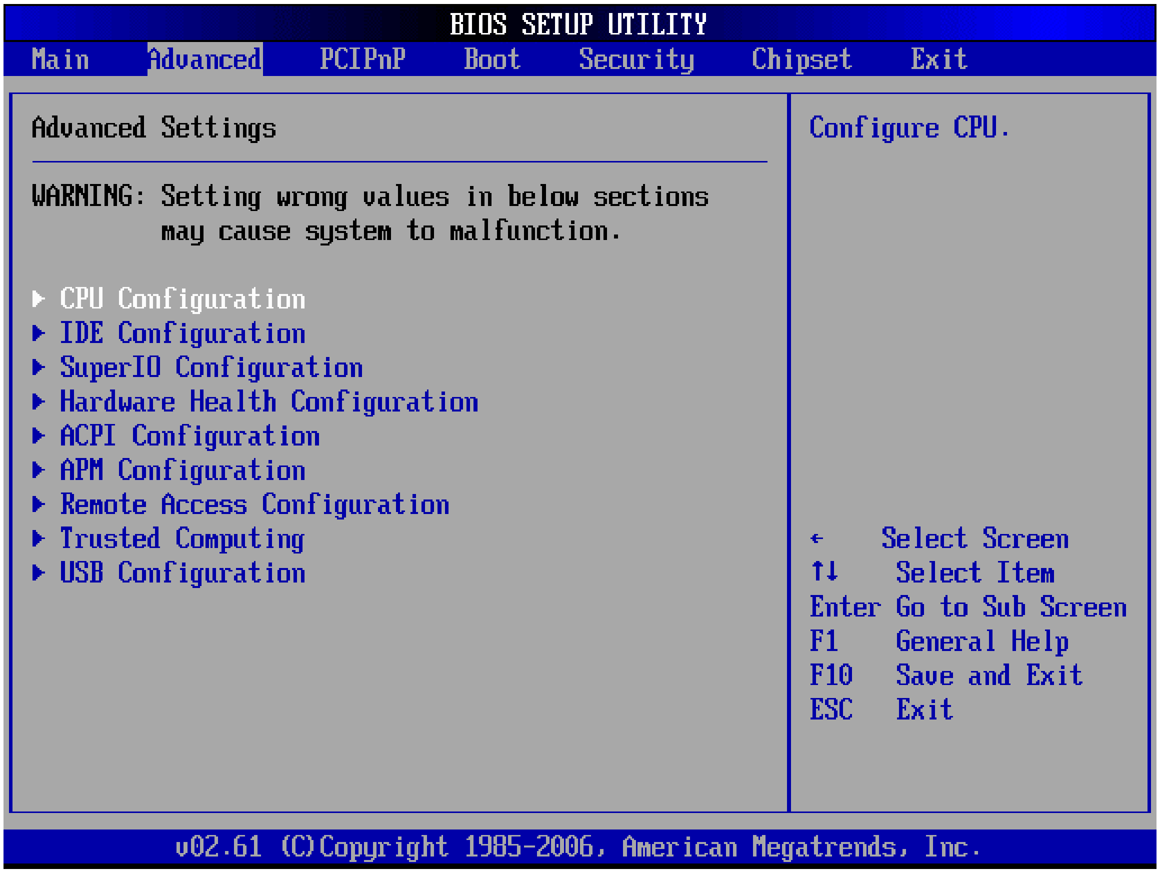
Use the **Advanced** menu to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- **CPU Configuration** (see Section **6.3.1**)
- **IDE Configuration** (see Section **6.3.2**)
- **SuperIO Configuration** (see Section **6.3.3**)
- **Hardware Health Configuration** (see Section **6.3.4**)
- **Trusted Computing** (see Section **6.3.8**)

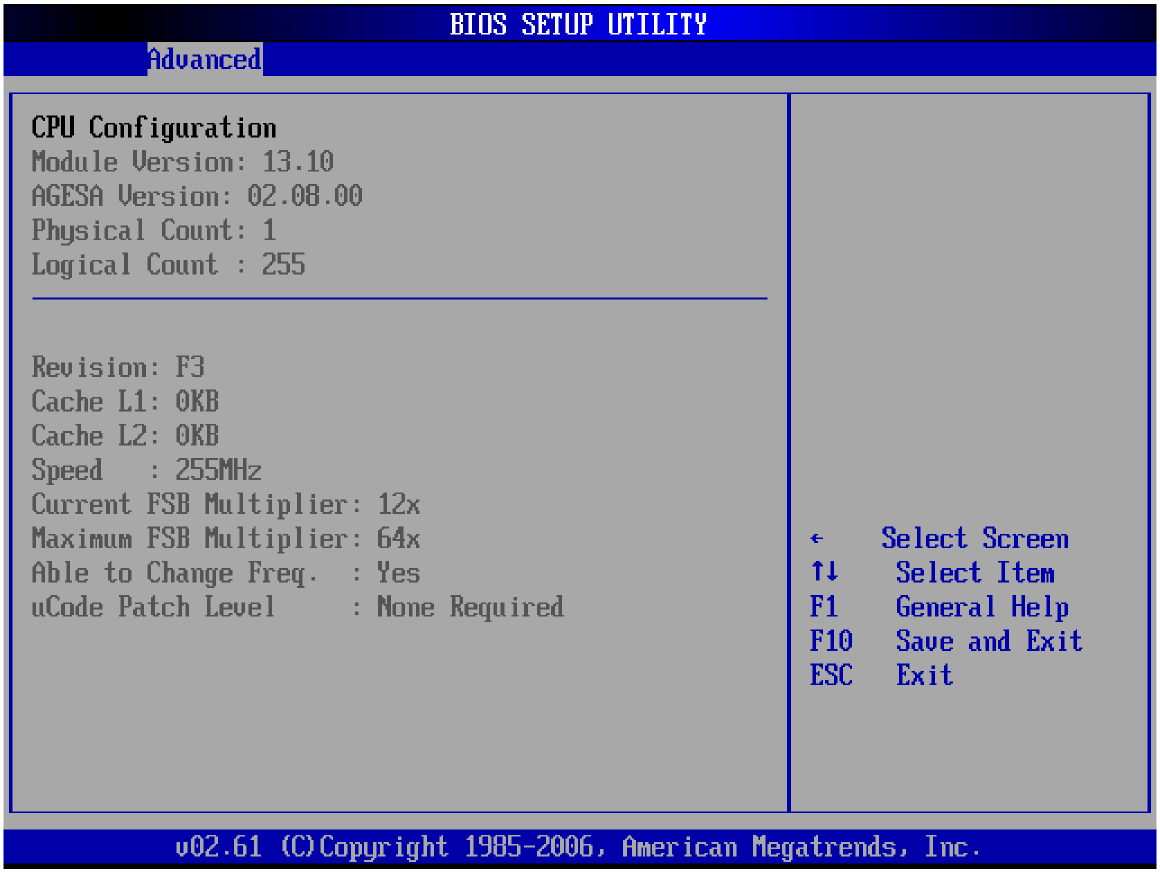
- **Remote Access Configuration** (see Section **6.3.4.1**)
- **USB Configuration** (see Section **6.3.8**)



BIOS Menu 2: Advanced

6.3.1 CPU Configuration

Use the CPU Configuration menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.



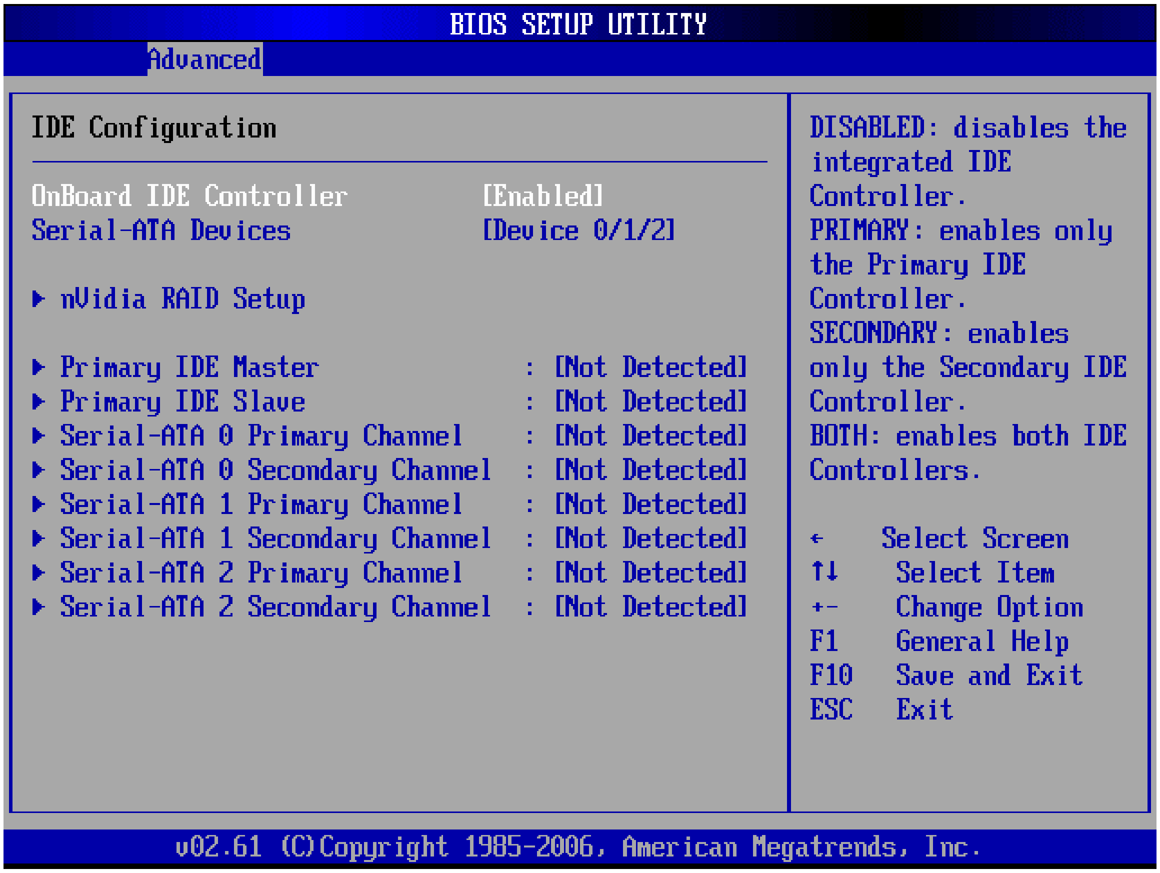
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- **Revision**: Lists the CPU revision number
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- **Speed:** Lists the CPU processing speed
- **Current FSB Multiplier**: Specifies how much the FSB is increased by
- **Maximum FSB Multiplier**: Specifies the maximum the FSB can be increased
- **Able to Change Freq**: Specifies the CPU frequency cannot be changed.
- **uCode Patch Level**:

6.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ **On-board IDE Controller [Both]**

The **On-board PCI IDE Controller** BIOS option specifies the IDE channels used by the on-board PCI IDE controller. The following configuration options are available.

- ➔ **Disabled** Prevents the system from using the on-board IDE controller
- ➔ **Enabled** Enables the system to use the on-board IDE controller

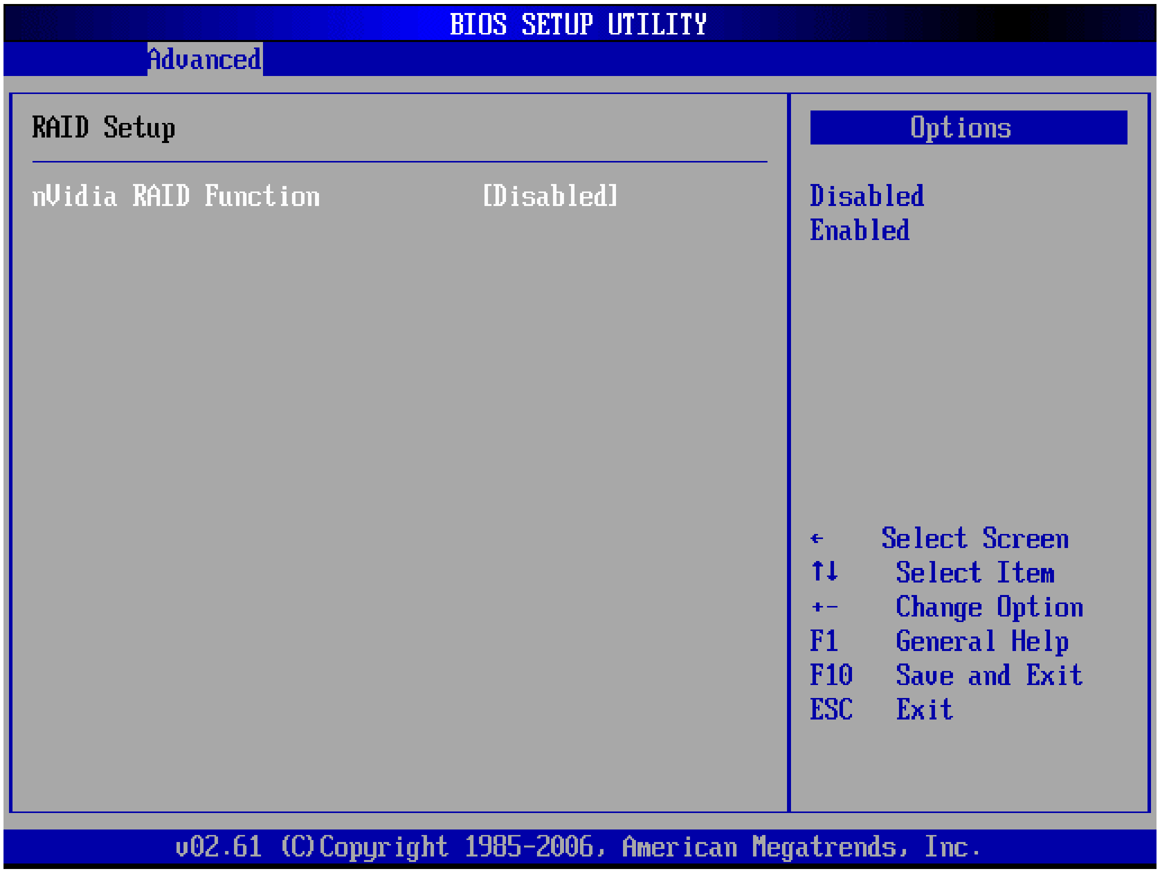
➔ Serial-ATA Devices [Device 0/1/2]

The **Serial-ATA Devices** BIOS option specifies the SATA channels that can be used by the system. The following configuration options are available.

- ➔ **Disabled** — All SATA drives channels are disabled. No SATA drives connected to the system will be detected by the system.
- ➔ **Device 0** — Only one SATA drive channel is accessible. This enables two SATA drives to be connected to the system.
- ➔ **Device 0/1** — Only two SATA drive channels are accessible. This enables two SATA drives to be connected to the system.
- ➔ **Device 0/1/2** **Default** — All SATA drive channels are enabled.

➔ nVidia RAID Setup

The **nVidia RAID** Setup option enables SATA drives to be configured as part of the RAID array. When the **nVidia RAID** Setup option is selected the following submenu appears:



BIOS Menu 5: RAID SETUP

➔ nVidia RAID Function

The **nVidia RAID Function** option enables or disables the RAID controller.

- ➔ **Disabled** RAID controller is disabled
- ➔ **Enabled** RAID controller is enabled

If the RAID controller is enabled, the following SATA drives can be either enabled or disabled.

- SATA 0 Primary Channel
- SATA 0 Secondary Channel
- SATA 1 Primary Channel

- SATA 1 Secondary Channel
- SATA 2 Primary Channel
- SATA 2 Secondary Channel

➔ IDE Master and IDE Slave

When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

➔ Serial-ATA Primary Channel and Secondary Channel

When entering setup, BIOS auto detects the presence of SATA devices. BIOS displays the status of the auto detected SATA devices. The following SATA devices are detected and are shown in the **IDE Configuration** menu:

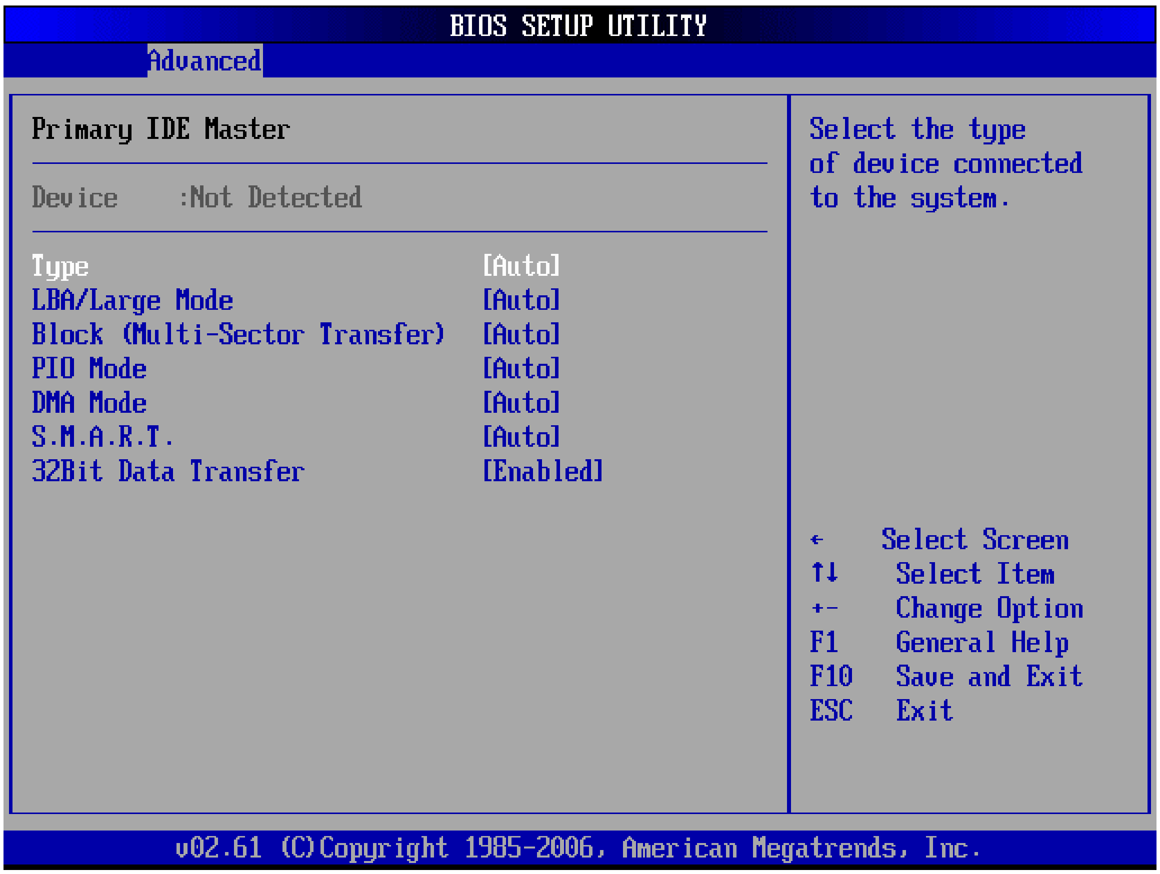
- Serial-ATA 0 Primary Channel
- Serial-ATA 0 Secondary Channel
- Serial-ATA 1 Primary Channel
- Serial-ATA 1 Secondary Channel
- Serial-ATA 2 Primary Channel
- Serial-ATA 2 Secondary Channel

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If a SATA device is detected, and one of the above

listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 6.3.2.1** appear.

6.3.2.1 IDE Master, IDE Slave and Serial-ATA Primary/Secondary Channel

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.



BIOS Menu 6: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The “grayed-out” items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**		BIOS is prevented from searching for an IDE disk drive on the specified channel.
➔ **Auto**	**DEFAULT**	The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.
➔ **CD/DVD**		The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of

IDE disk drives on the specified channel.

- **ARMD** This option specifies an ATAPI Removable Media Device. These include, but are not limited to:
  - **ZIP**
  - **LS-120**

→ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

- **Disabled** BIOS is prevented from using the LBA mode control on the specified channel.
- **Auto** DEFAULT BIOS auto detects the LBA mode control on the specified channel.

→ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

- **Disabled** BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.
- **Auto** DEFAULT BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto** **DEFAULT** BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

➔ **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps

➔ **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps

➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps

➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps

➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔ **Auto** **DEFAULT** BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.

➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps

➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps

➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps

- → **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps
- → **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps
- → **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps
- → **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps
- → **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps
- → **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps
- → **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- → **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)
- → **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9MBps (To use this mode, it is required that an 80-conductor ATA cable is used.)

→ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

- ➔ **Auto** **DEFAULT** BIOS auto detects HDD SMART support.
- ➔ **Disabled** Prevents BIOS from using the HDD SMART feature.
- ➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

- ➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.
- ➔ **Enabled** **DEFAULT** Allows BIOS to use 32-bit data transfers on supported hard disk drives.

6.3.3 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
                         BIOS SETUP UTILITY
          Advanced
 Configure Win627EHF Super IO Chipset        | Allows BIOS to Select
 ------------------------------------------- | Serial Port1 Base
 Serial Port1 Address        [3F8/IRQ4]      | Addresses.
 Serial Port2 Address        [2F8/IRQ3]      |
                                             |
                                             | ←     Select Screen
                                             | ↑↓    Select Item
                                             | +-    Change Option
                                             | F1    General Help
                                             | F10   Save and Exit
                                             | ESC   Exit
       v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

BIOS Menu 7: Super IO Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

- ➔ **Disabled** — No base address is assigned to Serial Port 1
- ➔ **3F8/IRQ4** **DEFAULT** — Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- ➔ **3E8/IRQ4** — Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- ➔ **2E8/IRQ3** — Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Address [2F8/IRQ3]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled** No base address is assigned to Serial Port 2

➔ **2F8/IRQ3 DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

➔ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

6.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 8**) shows the operating temperature, fan speeds and system voltages.

```
                          BIOS SETUP UTILITY
        Advanced
 Hardware Health Configuration
 -------------------------------------------------
 ▶ SMART FAN Control Configuration

 CPU Temperature              :49°C/120°F
 System Temperature           :34°C/93°F

 Vcore                        :1.224 V
 DDR2                         :1.824 V
 DDR2_IO                      :0.896 V
 5V                           :5.094 V
 12V                          :12.196 V
 3VSB                         :3.360 V
 VBAT                         :3.008 V
                                                  ←     Select Screen
                                                  ↑↓    Select Item
                                                  Enter Go to Sub Screen
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

         v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

BIOS Menu 8: Hardware Health Configuration

→ SMART FAN Control Configuration

Use the **SMART FAN Control Configuration** option to specify and monitor the fan. When this option is selected, a new menu appears. See .

→ Monitored Parameters

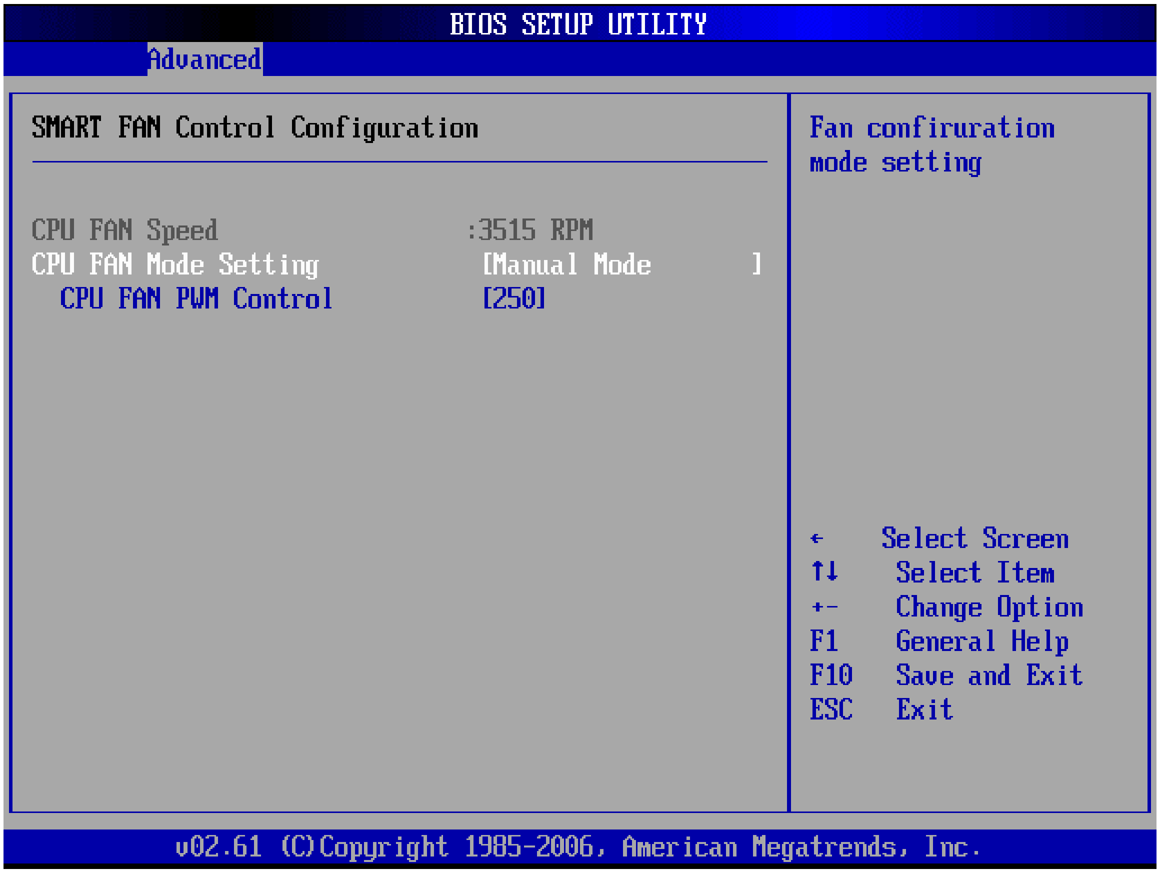
The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
  - System Temperature
- **Voltages**: The following system voltages are monitored

- Vcore
- DDR2
- DDR2_IO
- 5V
- 12V
- 3VSB
- VBAT

6.3.4.1 SMART FAN Control Configuration

Use the SMART FAN Control Configuration menu to configure and monitor the cooling fan parameters



BIOS Menu 9: SMART FAN Control Configuration

➔ CPU FAN Mode Setting [Manual Mode]

Use the **CPU FAN Mode Setting** option to select the mode the fan will operate in.

➔ **Manual Mode** DEFAULT Enables the PWM duty cycle to be selected and controlled.

➔ **Thermal Cruise Mode** Enables system temperature parameters to be set for the control of the fan

➔ CPU Fan PWM Control [070]

The **CPU Fan PWM Control** option can only be set if the **CPU FAN Mode Setting** option is set to **Manual Mode**. Use the **CPU Fan PWM Control** option to select PWM duty cycle control. The PWM duty cycle specifies the width of the modulated pulse. A high value ensures a wide pulse and a low value ensures a narrow pulse. To select a value, select the **CPU Fan PWM Control** option and enter a decimal number between 000 and 127. The PWM Duty Cycle control range is specified below.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 255

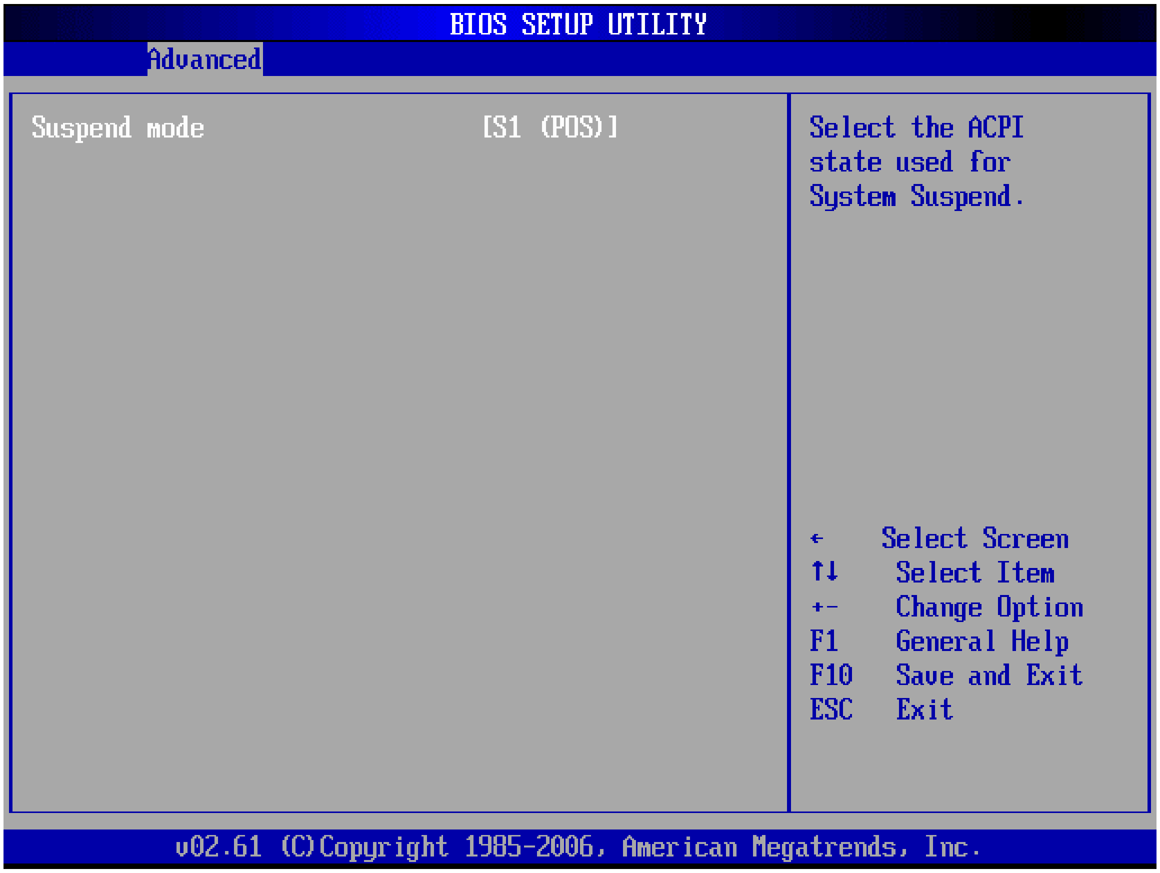
➔ Thermal Cruise Mode Settings

When the **CPU FAN 1 Mode Setting** option is in the **Thermal Cruise Mode**, the following parameters can be set.

- CPU FAN TargetTemp Value
- CPU FAN Tolerance Value
- CPU FAN StartUp Value
- CPU FAN Stop Value
- CPU FAN StopTime Value

6.3.5 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 10**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 10: ACPI Configuration

➔ **Suspend Mode [S1(POS)]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

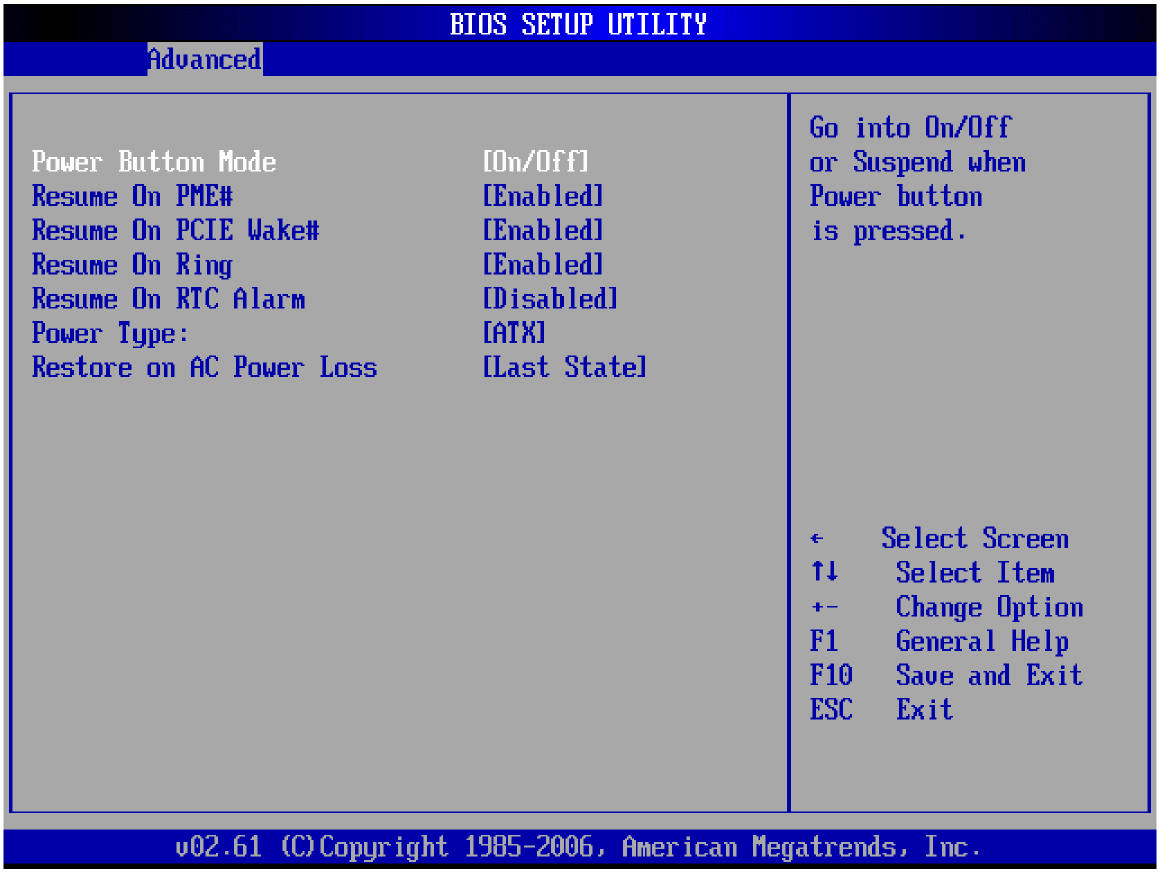
➔ **S1 (POS)** **DEFAULT** System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **S3 (STR)** System appears off. The CPU has no power; RAM is in

slow refresh; the power supply is in a reduced power mode.

6.3.6 APM Configuration

The APM Configuration menu (**BIOS Menu 11**) allows the advanced power management options to be configured.



```
BIOS SETUP UTILITY
Advanced

Power Button Mode            [On/Off]         Go into On/Off
Resume On PME#               [Enabled]        or Suspend when
Resume On PCIE Wake#         [Enabled]        Power button
Resume On Ring               [Enabled]        is pressed.
Resume On RTC Alarm          [Disabled]
Power Type:                  [ATX]
Restore on AC Power Loss     [Last State]

                                              ←    Select Screen
                                              ↑↓   Select Item
                                              +-   Change Option
                                              F1   General Help
                                              F10  Save and Exit
                                              ESC  Exit

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```

BIOS Menu 11:Advanced Power Management Configuration

➔ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

➔ **On/Off** DEFAULT When the power button is pressed the system is either

turned on or off

- **Suspend** — When the power button is pressed the system goes into suspend mode

Resume on PME# [Disabled]

Use the **Resume on PME#** BIOS option to enable activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

- **Disabled** DEFAULT — Wake event not generated by PCI PME controller activity
- **Enabled** — Wake event generated by PCI PME controller activity

Resume on PCIE WAKE# [Enabled]

The **Resume on PCIE WAKE#** BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the PCI-Express bus.

- **Disabled** — Wake event not generated by PCI-Express activity
- **Enabled** DEFAULT — Wake event generated by PCI-Express activity

Resume on Ring [Disabled]

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

- **Disabled** DEFAULT — Wake event not generated by an incoming call
- **Enabled** — Wake event generated by an incoming call

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** option to specify the time the system should be roused from a suspended state.

➔ **Disabled** DEFAULT The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following appears with values that can be selected:

➔ **RTC Alarm Date (Days)**

➔ **System Time**

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

➔ **Power Type [ATX]**

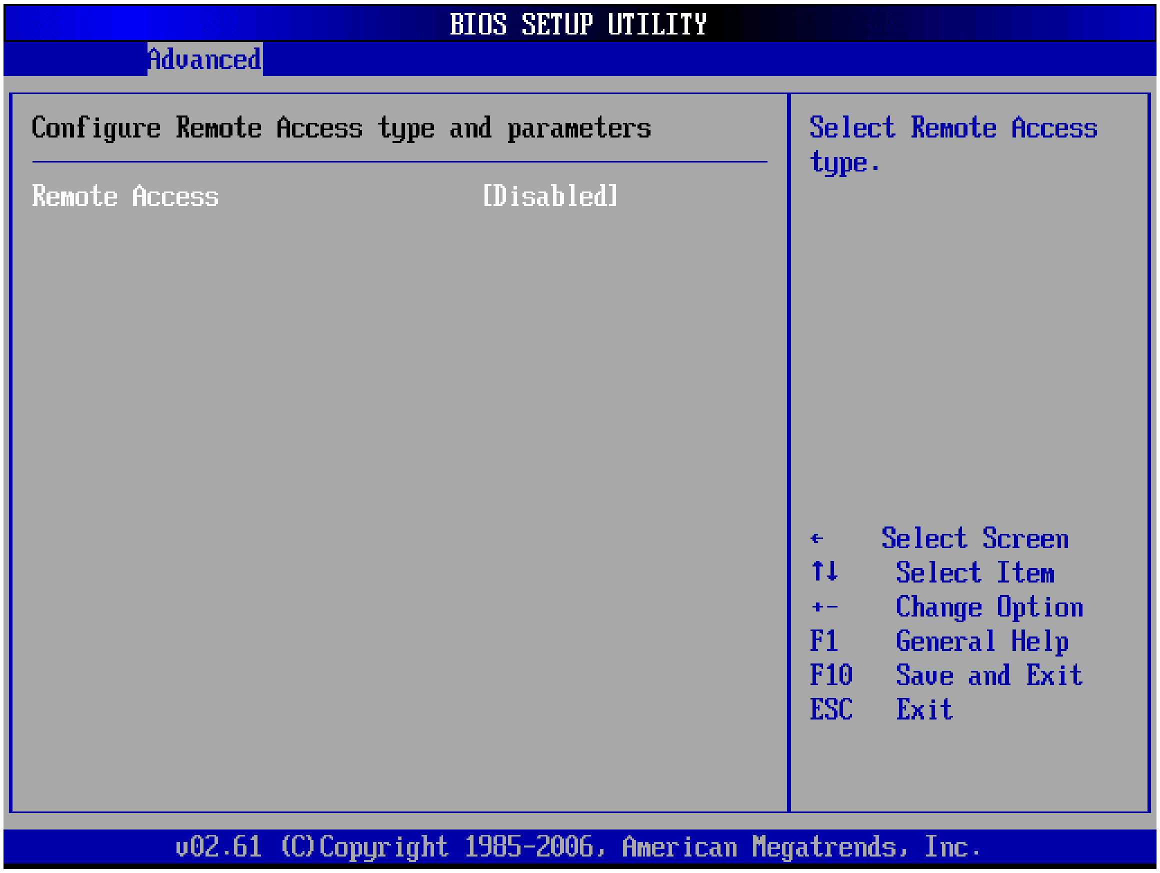
Use the **Power Type** BIOS option to select the power supply that is connected to the system.

➔ **AT** An AT power supply is connected to the system

➔ **ATX** DEFAULT An ATX power supply is connected to the system

6.3.7 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 12**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.



BIOS Menu 12: Remote Access Configuration [Advanced]

→ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

- → **Disabled** DEFAULT Remote access is disabled.
- → **Enabled** Remote access configuration options shown below appear:
  - → **Serial Port Number**
  - → **Serial Port Mode**

- **Flow Control**
- **Redirection after BIOS POST**
- **Terminal Type**
- **VT-UTF8 Combo Key Support**
- **Sredir Memory Display Delay**

These configuration options are discussed below.

Serial Port Number [COM1]

Use the **Serial Port Number** option to select the serial port used for remote access.

COM1	**DEFAULT**	System is remotely accessed through COM1
COM2		System is remotely accessed through COM2

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

Base Address, IRQ [3F8h,4]

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

Serial Port Mode [115200 8,n,1]

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Flow Control [None]**

Use the **Flow Control** option to report the flow control method for the console redirection application.

➔ **None** DEFAULT No control flow,

➔ **Hardware** Hardware is set as the console redirection

➔ **Software** Software is set as the console redirection

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled** The console is not redirected after POST

➔ **Boot Loader** Redirection is active during POST and during Boot Loader

➔ **Always** DEFAULT Redirection is always active (Some OSes may not work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI** DEFAULT The target terminal type is ANSI

➔ **VT100** The target terminal type is VT100

→ **VT-UTF8** The target terminal type is VT-UTF8

→ **VT-UTF8 Combo Key Support [Disabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

→ **Disabled** **DEFAULT** Disables the VT-UTF8 terminal keys

→ **Enabled** Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

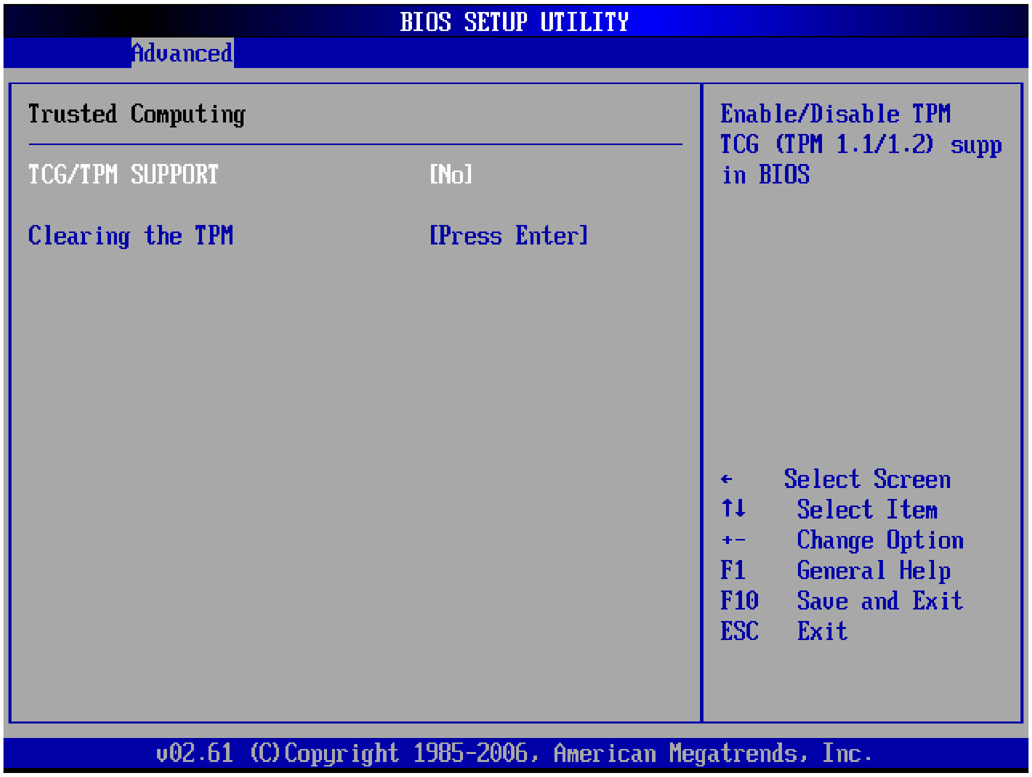
→ **Sredir Memory Display Delay [Disabled]**

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay **DEFAULT**
- Delay 1 sec
- Delay 2 sec
- Delay 4 sec

6.3.8 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 13: Trusted Computing**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 13: Trusted Computing

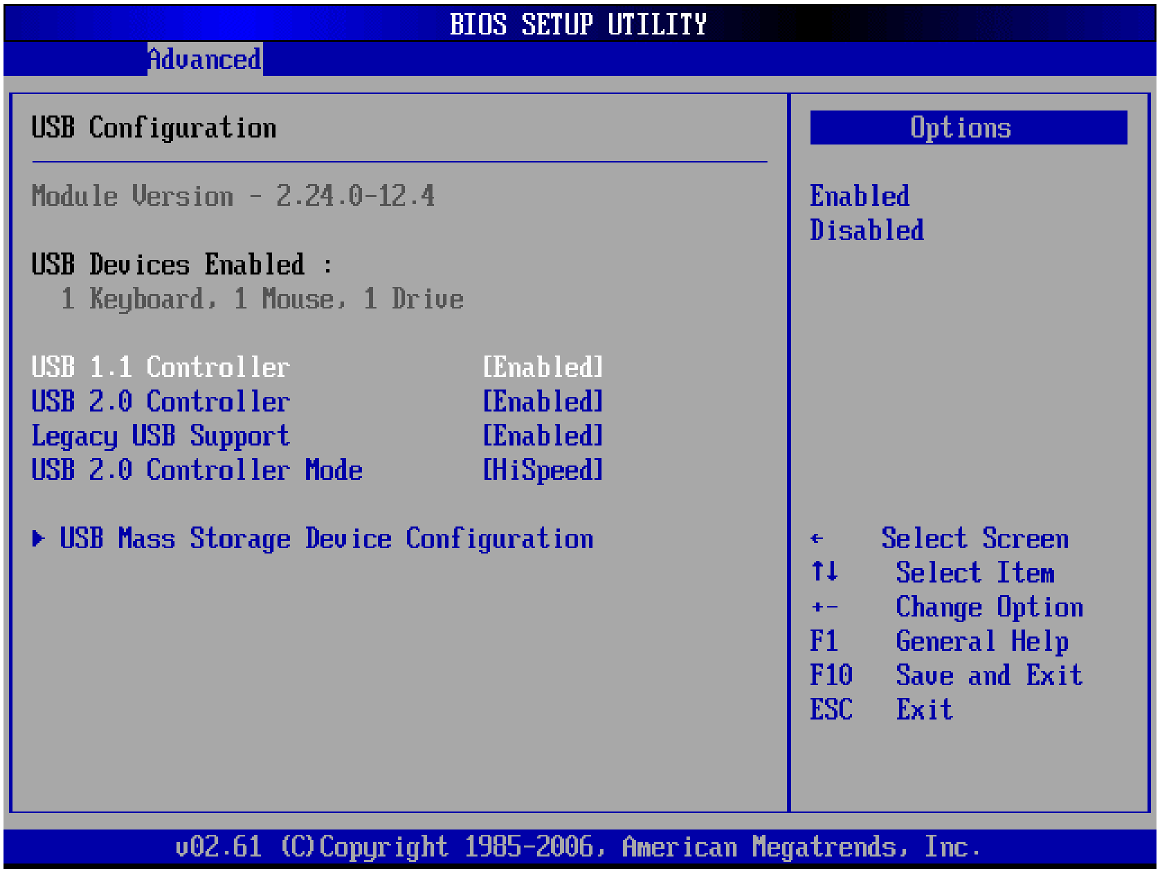
➔ **TCG/TPM Support [Yes]**

Use the **TCG/TPM Support** option to configure support for the TPM.

- ➔ **No** **DEFAULT** TPM support is disabled.
- ➔ **Yes** TPM support is enabled.

6.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 14**) to read USB configuration information and configure the USB settings.



BIOS Menu 14: USB Configuration

➔ USB 1.1 Controller [Enabled]

The **USB 1.1 Controller** BIOS option enables or disables the USB 1.1 controller

- ➔ **Disabled** USB 1.1 function disabled
- ➔ **Enabled** (Default) USB 1.1 function enabled

➔ USB 2.0 Controller [Enabled]

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

- ➔ **Disabled** USB EHCI function disabled
- ➔ **Enabled** (Default) USB function enabled

→ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

→ **Disabled**		Legacy USB support disabled
→ **Enabled**	**DEFAULT**	Legacy USB support enabled
→ **Auto**		Legacy USB support disabled if no USB devices are connected

→ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

→ **FullSpeed**		The controller is capable of operating at 12Mb/s
→ **HiSpeed**	**DEFAULT**	The controller is capable of operating at 480Mb/s

6.4 PCI/PnP

Use the PCI/PnP menu (**BIOS Menu 15**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

```
                          BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
+-----------------------------------------------+------------------------+
| Advanced PCI/PnP Settings                     | Available: Specified   |
|-----------------------------------------------| IRQ is available to be |
| WARNING: Setting wrong values in below sections| used by PCI/PnP        |
|          may cause system to malfunction.     | devices.               |
|                                               | Reserved: Specified    |
| IRQ3                       [Reserved]         | IRQ is reserved for    |
| IRQ4                       [Reserved]         | use by Legacy ISA      |
| IRQ5                       [Available]        | devices.               |
| IRQ7                       [Available]        |                        |
| IRQ9                       [Available]        |                        |
| IRQ10                      [Available]        |                        |
| IRQ11                      [Available]        | ←     Select Screen    |
| IRQ14                      [Available]        | ↑↓    Select Item      |
| IRQ15                      [Available]        | +-    Change Option    |
|                                               | F1    General Help     |
| DMA Channel 0              [Available]        | F10   Save and Exit    |
| DMA Channel 1              [Available]        | ESC   Exit             |
| DMA Channel 3              [Available]        |                        |
| DMA Channel 5              [Available]        |                        |
+-----------------------------------------------+------------------------+
        v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

BIOS Menu 15: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** DEFAULT — The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** — The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5

- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

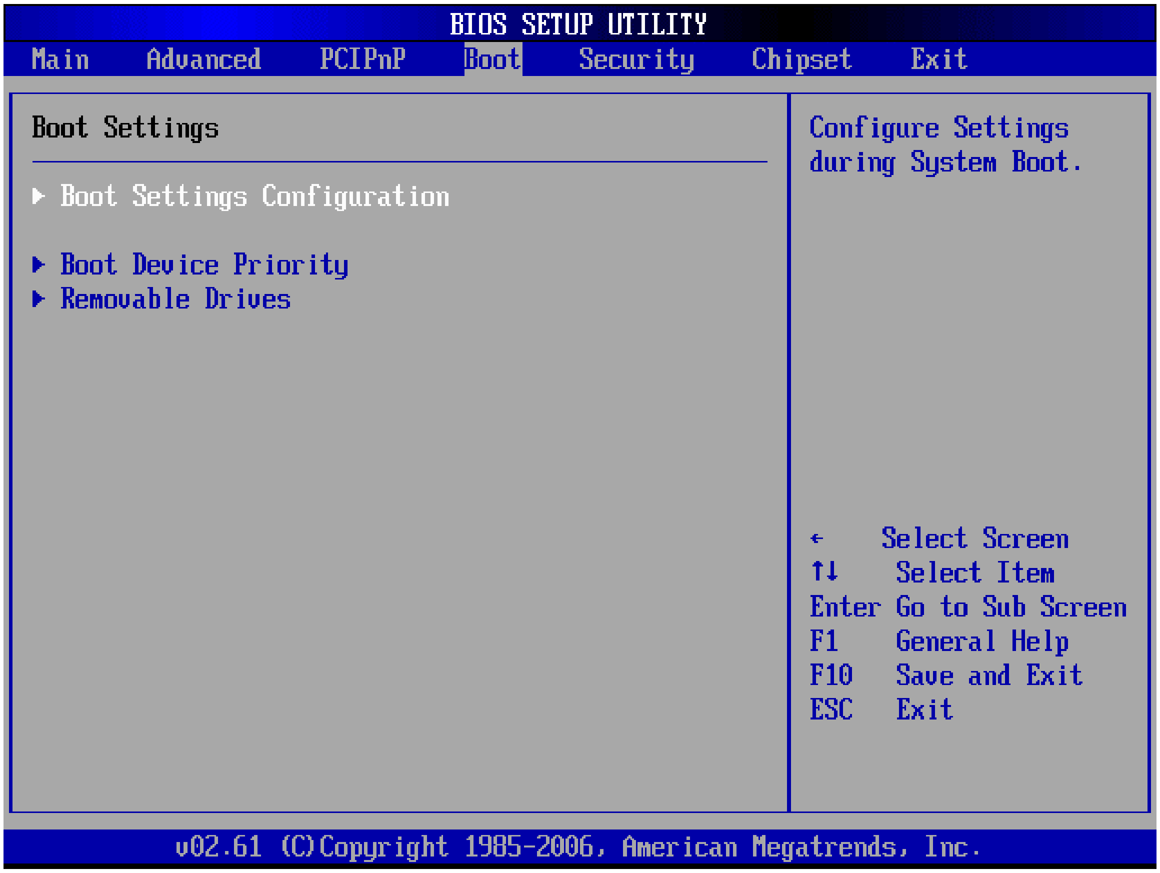
➔ **Available**	**DEFAULT**	The specified DMA is available to be used by PCI/PnP devices
➔ **Reserved**		The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

6.5 Boot

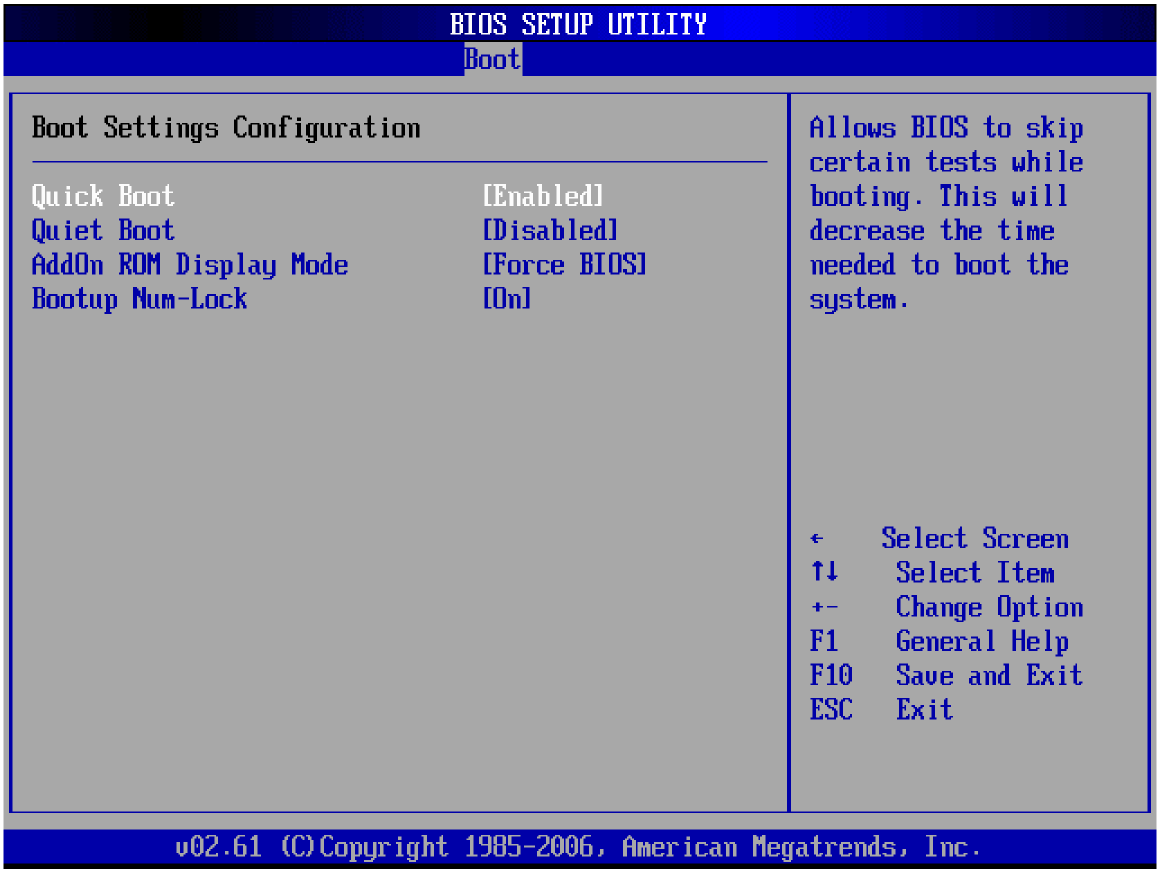
Use the Boot menu (**BIOS Menu 16**) to configure system boot options.



BIOS Menu 16: Boot

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (**BIOS Menu 17**) to configure advanced system boot options.



BIOS Menu 17: Boot Settings Configuration

➔ Quick Boot [Enabled]

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**		No POST procedures are skipped
➔ **Enabled**	**DEFAULT**	Some POST procedures are skipped to decrease the system boot time

➔ Quiet Boot [Disabled]

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**	**DEFAULT**	Normal POST messages displayed

➔ **Enabled** OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS** **DEFAULT** Allows the computer system to force a third party BIOS to display during system boot.

➔ **Keep Current** Allows the computer system to display the information during system boot.

➔ **Bootup Num-Lock [Off]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

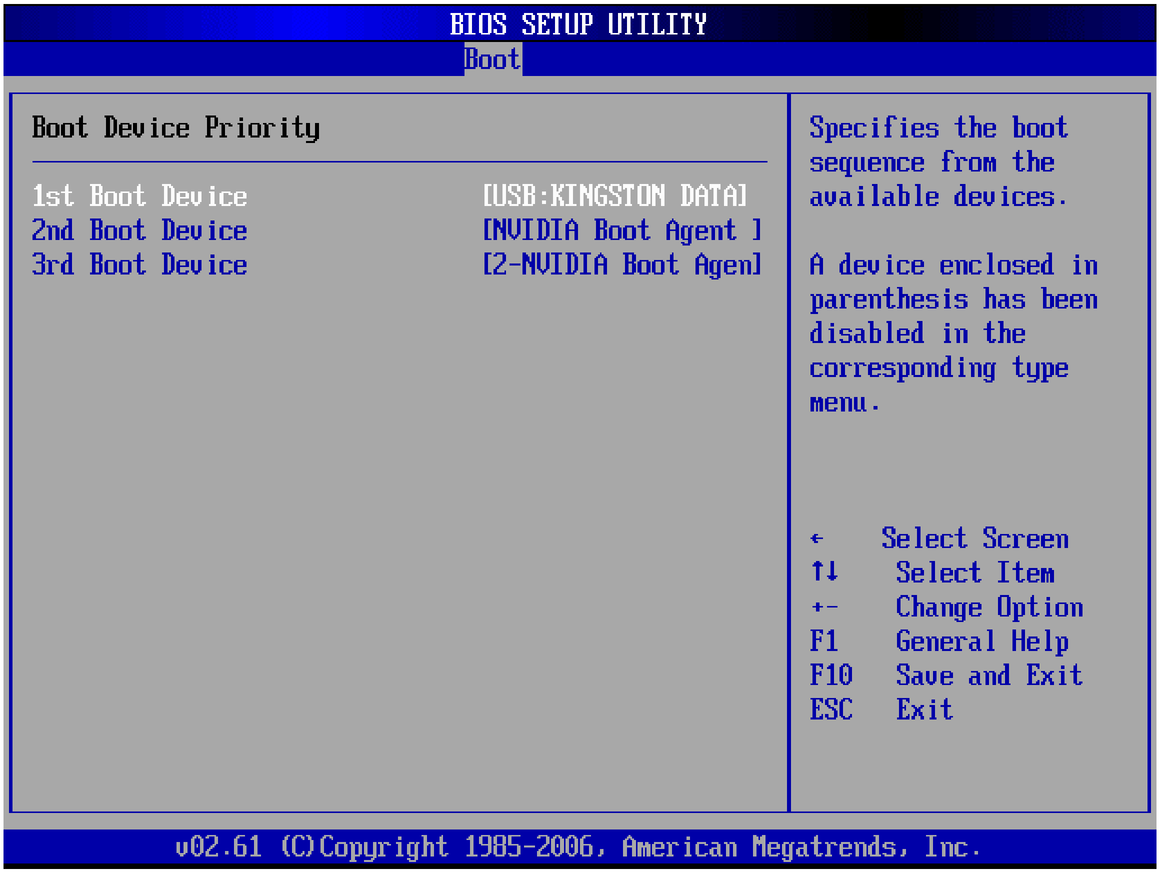
➔ **Off** **DEFAULT** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **On** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

6.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 18**) to specify the boot sequence from the available devices. The following options are available:

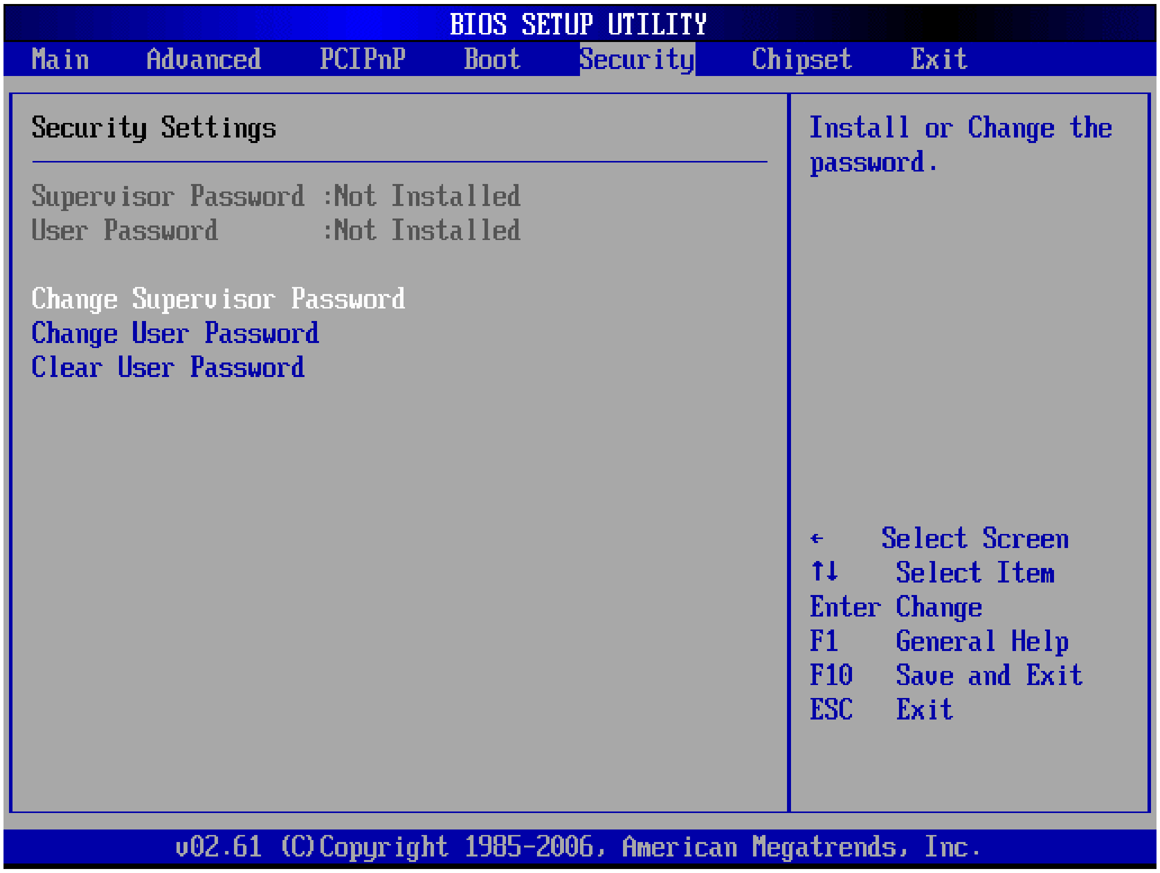
- 1st Boot Device
- 2nd Boot Device



BIOS Menu 18: Boot Device Priority Settings

6.6 Security

Use the Security menu (**BIOS Menu 19**) to set system and user passwords.



BIOS Menu 19: Security

→ Change Supervisor Password

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

→ Change User Password

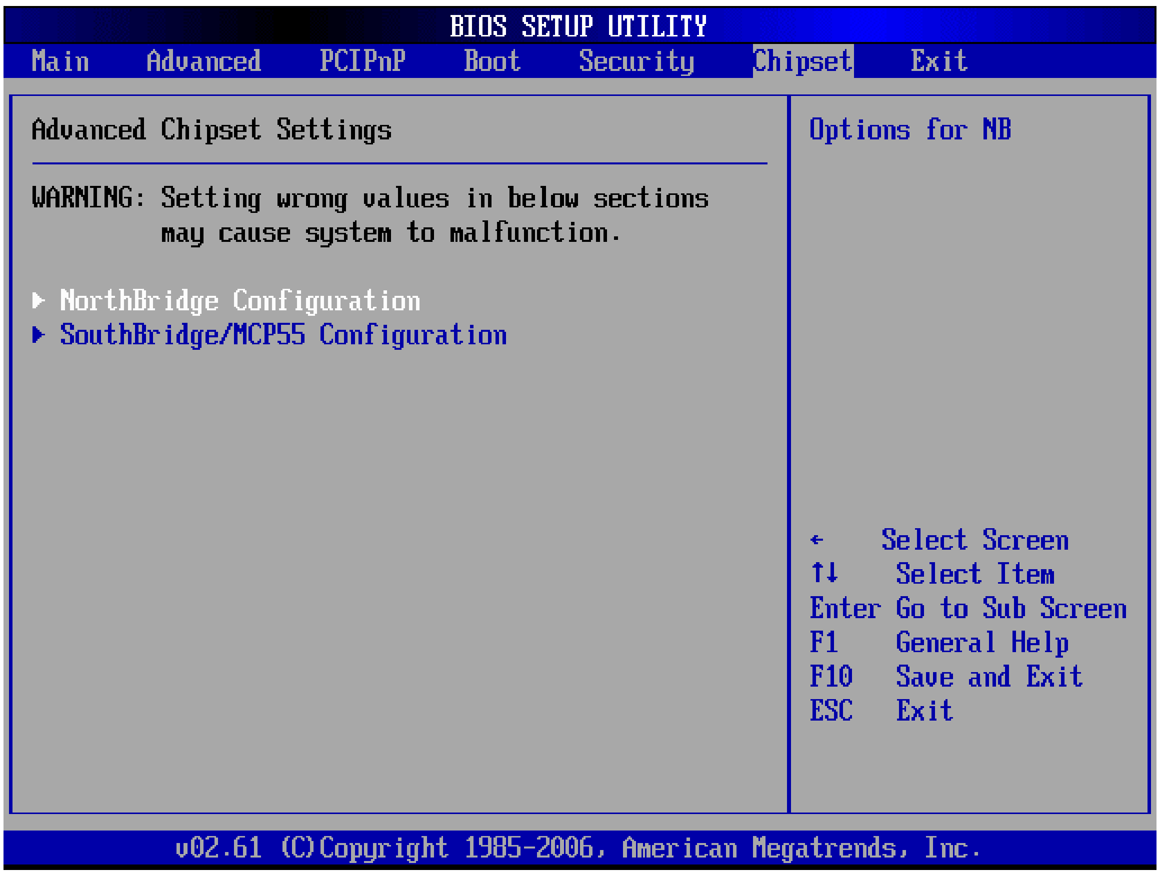
Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

6.7 Chipset

Use the **Chipset** menu to access the NorthBridge and SouthBridge configuration menus

WARNING!

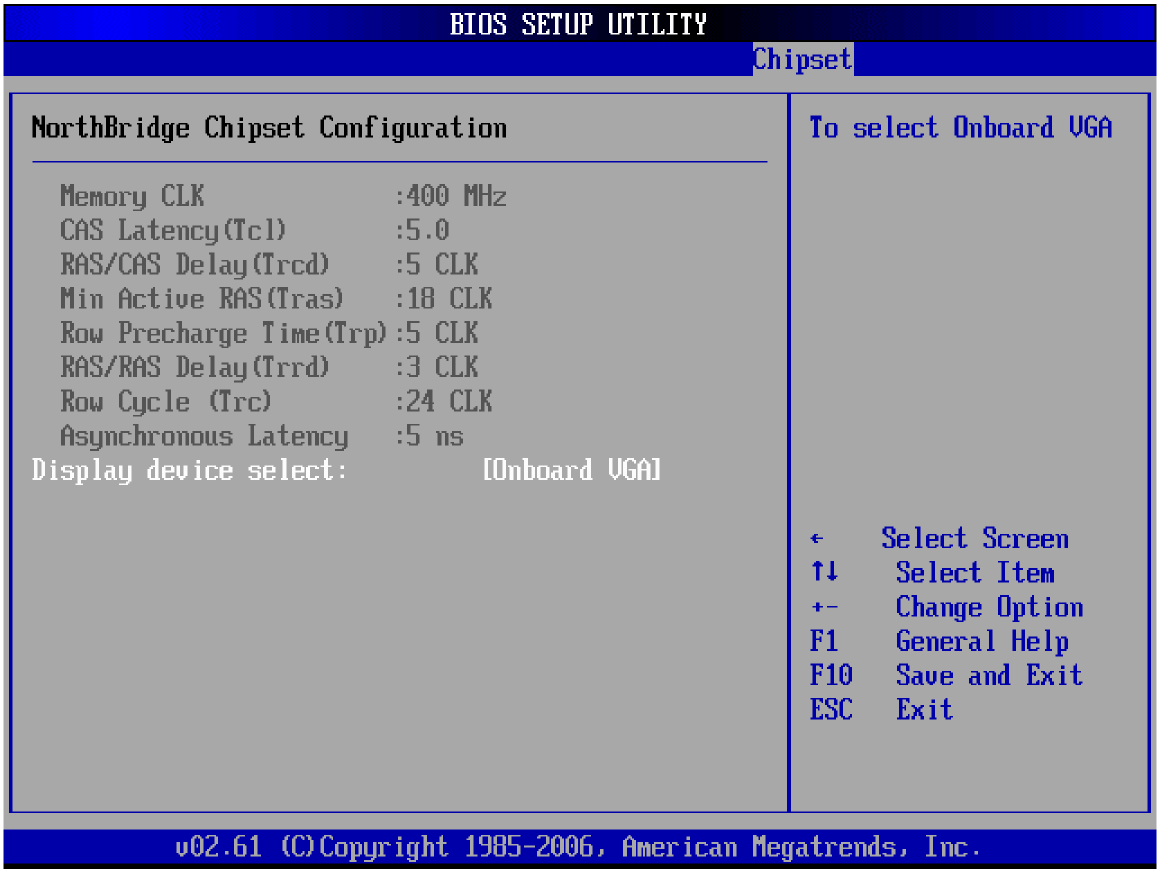
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 20: Chipset

6.7.1 NorthBridge Chipset Configuration

Use the NorthBridge Chipset Configuration menu (**BIOS Menu 21**) to check the northbridge chipset settings.



BIOS Menu 21:NorthBridge Chipset Configuration

The **NorthBridge Chipset Configuration** menu has no configurable options. The NorthBridge Chipset configuration menu shows the following Northbridge chipset settings:

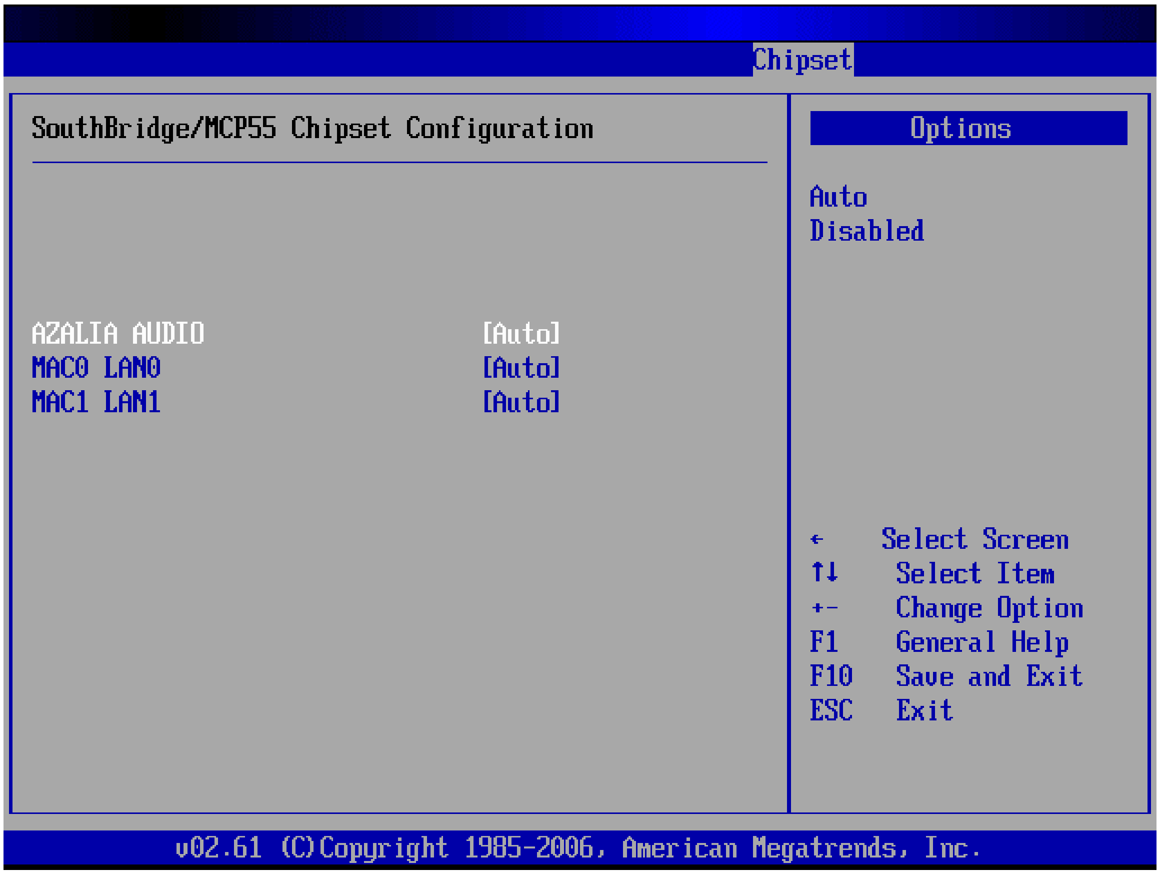
- **Memory CLK**: Shows the speed of the memory controller
- **CAS (Latency)**: Specifies the Column Address Strobe (CAS) delay time
- **RAS/CAS Delay(Trcd):** Specifies the number of clock cycles that must elapse between sending a RAS (row address strobe) signal and the CAS (column address strobe) signal.
- **Min Active RAS (Tras)**: Specifies the speed at which the RAM terminates the

access of one row and start accessing another.

- **Row Precharge Time(Trp)**: Specifies the length of the delay between the activation and precharge commands for the RAS signal.
- **RAS/RAS Delay(Trrd):**
- **Row Cycle (Trc):**
- **Asynchronous Latency:**

6.7.2 SouthBridge/MCP55 Configuration

The SouthBridge/MCP55 Configuration menu (**BIOS Menu 22**) enables the Southbridge chipset to be configured.



BIOS Menu 22:SouthBridge Chipset Configuration

➔ AZALIA AUDIO [Auto]

Use the **AZALIA AUDIO** BIOS option to enable or disable the AC'96 audio controller.

- ➔ **Disabled** AC'97 audio controller is disabled
- ➔ **Auto** (Default) AC'97 audio controller is detected automatically

➔ MAC0 LAN0 [Auto]

Use the **MAC0 LAN0** option to enable or disable the MAC LAN controller.

- ➔ **Disabled** MAC0 LAN0 controller is disabled
- ➔ **Enabled** DEFAULT MAC0 LAN0 controller is enabled

➔ MAC0 LAN1 [Auto]

Use the **MAC1 LAN1** option to enable or disable the MAC LAN controller.

- ➔ **Disabled** MAC1 LAN1 controller is disabled
- ➔ **Enabled** DEFAULT MAC1 LAN1 controller is enabled

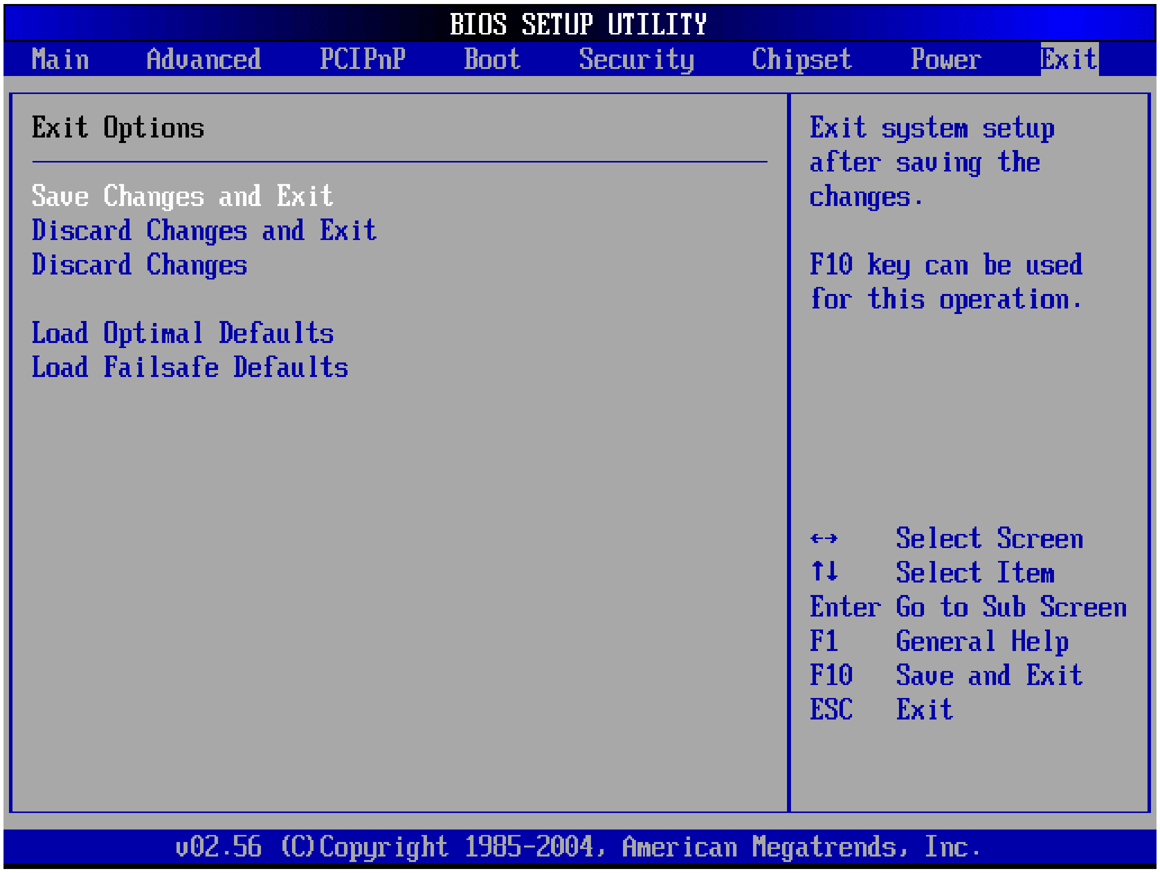
➔ Restore on AC Power Loss [Last State]

The Restore on AC Power Loss BIOS option specifies what state the system returns to if there is a sudden loss of power to the system.

- ➔ **Power Off** The system remains turned off
- ➔ **Power On** The system turns on
- ➔ **Last State** (Default) The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

6.8 Exit

Use the **Exit** menu (**BIOS Menu 23**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 23:Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

→ Discard Changes

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

→ Load Optimal Defaults

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

→ Load Failsafe Defaults

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Chapter

7

RAID Setup

7.1 Introduction

The SATA RAID can control serial ATA (SATA) disks. The SATA RAID is a cost-effective RAID functionality that can increase the data read/write speed and provide protection to data by distributing mirrored duplicates of data onto two or more disk drives.

CAUTION:

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

7.2 Precautions

In a RAID system if a single hard drive fails within a RAID array, the failed drive can be replaced and the RAID configuration restored.

WARNING:

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION:

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

7.3 Features and Benefits

- Supports RAID levels 0, 1, 10, RAID 5 and JBOD
- Supports connectivity to two or more disk drives
- Windows-based software for RAID management

7.4 Setting up the RAID

To install the RAID controller using Windows or a later OS, please follow the steps below.

Step 1: **Connect SATA drives to the system**. Connect at least two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are **EXACTLY** the same when they are configured in a RAID configuration (JBOD, RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: Turn on the system and access the BIOS.

Step 3: Access the Advanced menu option (Section **6.3**).

Step 4: Access the IDE Configuration sub-menu (Section **6.3.2**)

Step 5: Select the **nVidia RAID Setup** option.

Step 6: The menu in **Figure 7-1** appears

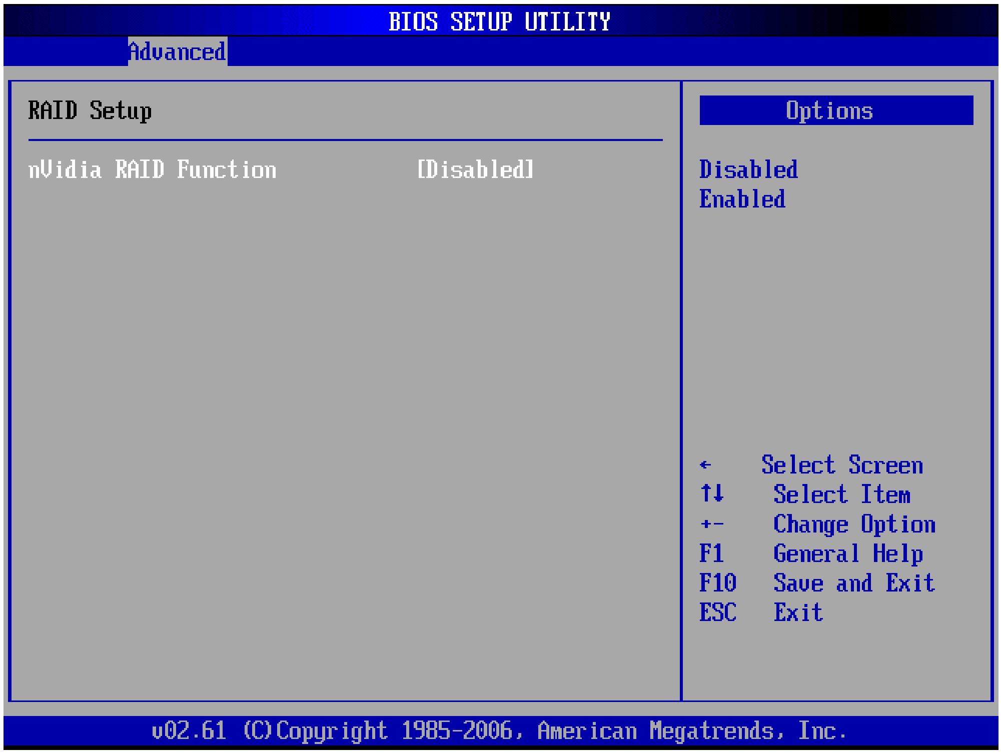


Figure 7-1: NVIDIA RAID Setup

Step 7: Enable the NVIDIA RAID function in the menu shown in **Figure 7-1**.

Step 8: Save the changes and Exit the BIOS Setup Utility.

Step 9: Restart the computer.

Step 10: Push the "**F10**" key when the system reboots.

Step 11: The RAID setup utility program appears.

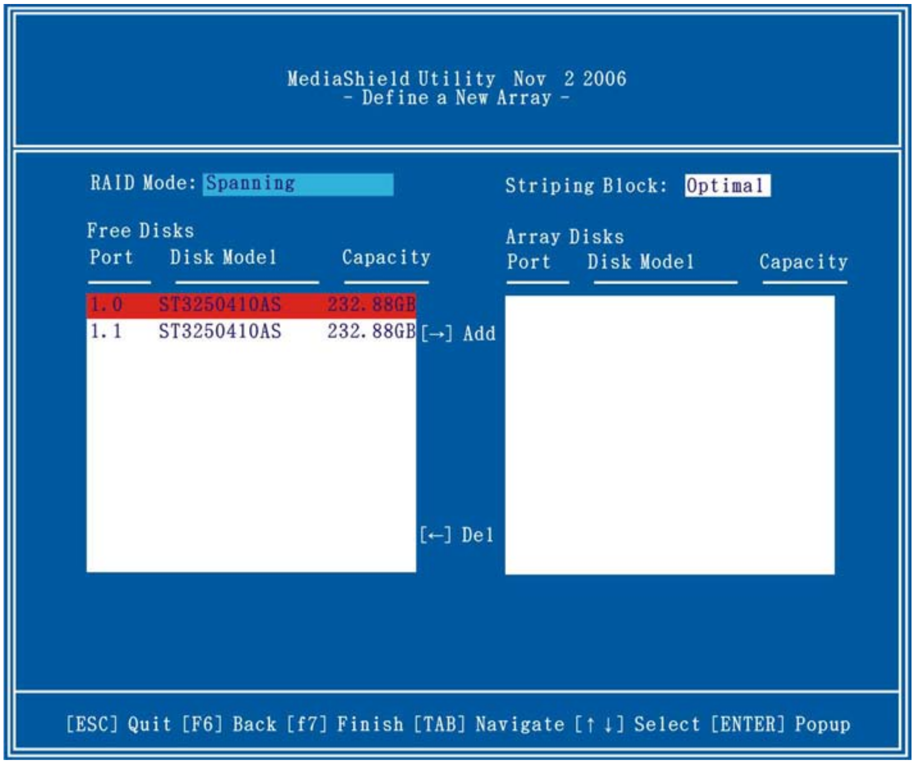


Figure 7-2: RAID Setup Utility

Step 12: Locate the RAID Mode setting.

Step 13: Select the RAID configuration type:

- Mirroring
- Striping
- Striping and mirroring
- Spanning
- RAID 5

Step 14: Locate the “Free Disks” sector of the screen.

Step 15: From the list of free disks, select the disks that are being used in the RAID array.

Step 16: To select a disk, move the cursor onto the disk name and then hit the right arrow button (→). The disk name is then shifted to the “Array Disks” sector of the screen.

Step 17: Once all the disks are selected, press “**F7**” to finish.

7.5 RAID Tool Access

To understand how to use the RAID tool please access the RAID HTML help file from the CD drive that came with the system. Insert the CD into the system and access the "**raid_tool.html**" file from following directory:

- [CD Drive]:\5-SATA RAID\VIA_RAID_V530C\RaidTool\Utility

Chapter

8

Software Drivers

8.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset driver
- VGA driver
- Audio driver

Installation instructions are given below.

8.2 Driver CD Auto-run

All the drivers for the SPCIE-3600AM2 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the system does not initiate the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (where **X:** is the system CD drive) to access the IEI Driver CD main menu.

Step 2: The driver main menu appears (**Figure 8-1**).

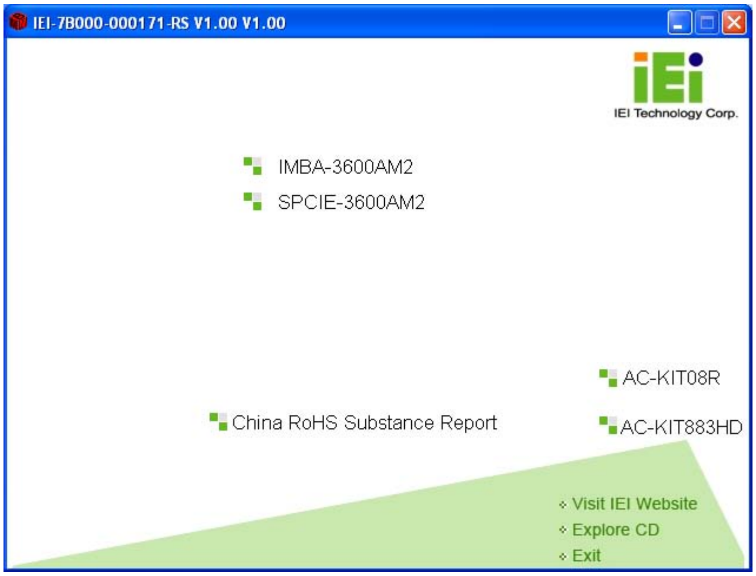


Figure 8-1: Introduction Screen

Step 3: Click SPCIE-3600AM2.

Step 4: A new screen with a list of available drivers appears (**Figure 8-2**).

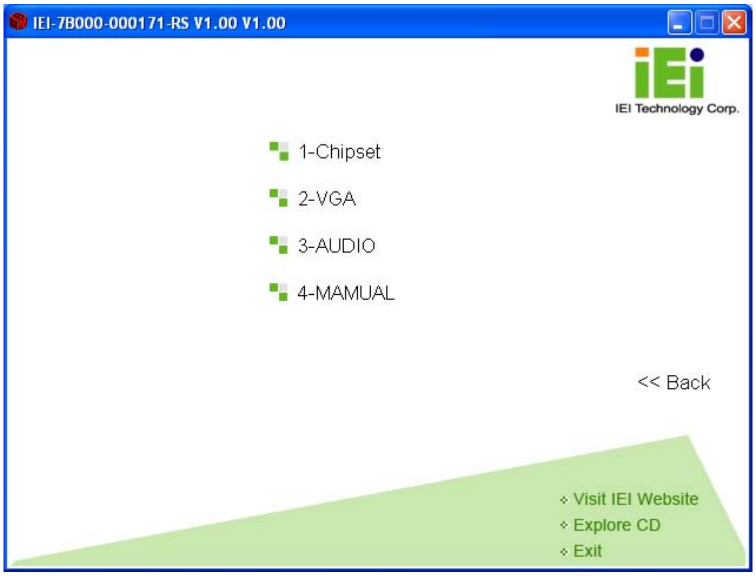


Figure 8-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 8-2**. Detailed driver installation instructions follow below.

8.3 Chipset Driver Installation

To install the chipset driver, please follow the steps below.

Step 1: Select Chipset from the list in **Figure 8-2**.

Step 2: A new window opens (**Figure 8-3**).

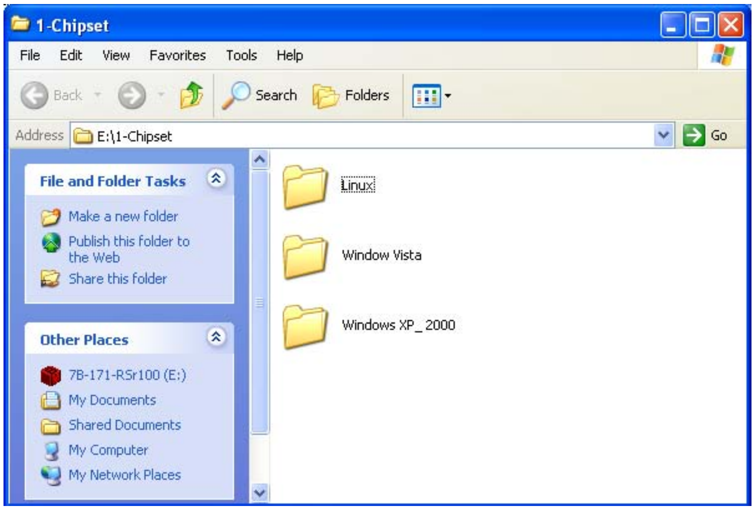


Figure 8-3: Select OS for Chipset Driver Installation

Step 3: Double-click the directory icon for the operating system that is running on the system.

Step 4: The screen in **Figure 8-4** appears if Windows XP is selected.

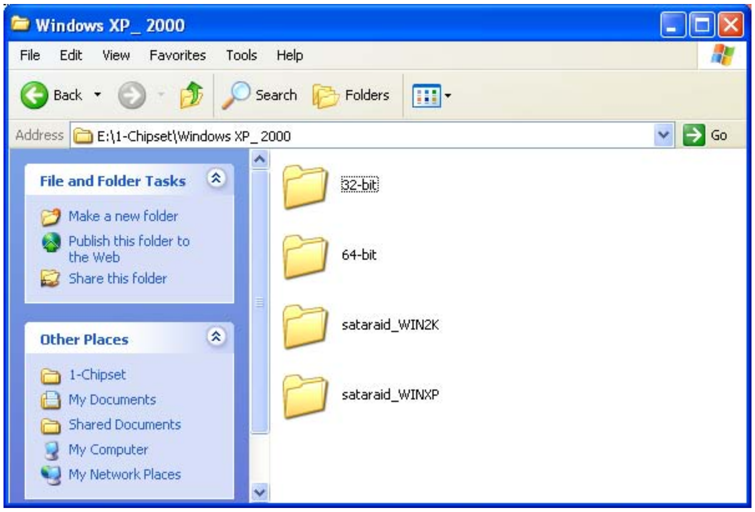


Figure 8-4: Operating System Type

Step 5: Select the operating system type. The screen in **Figure 8-5** appears.

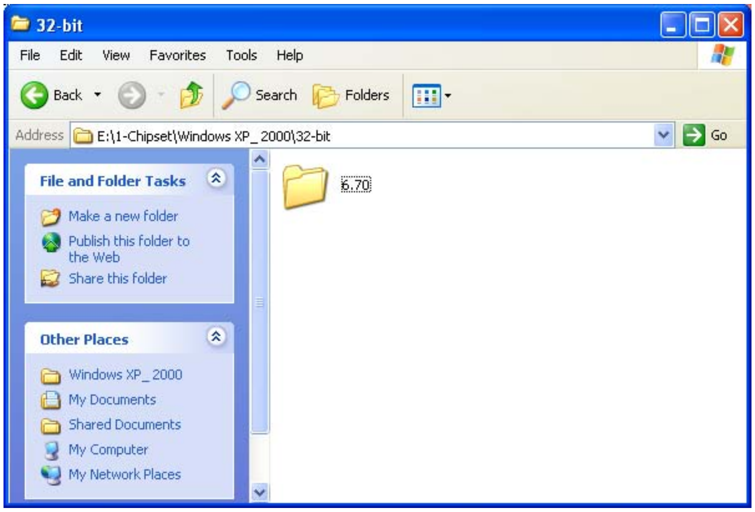


Figure 8-5: Chipset Driver Revision Directory Icon

Step 6: Double click the directory icon in **Figure 8-5**.

Step 7: The screen in **Figure 8-6** appears.

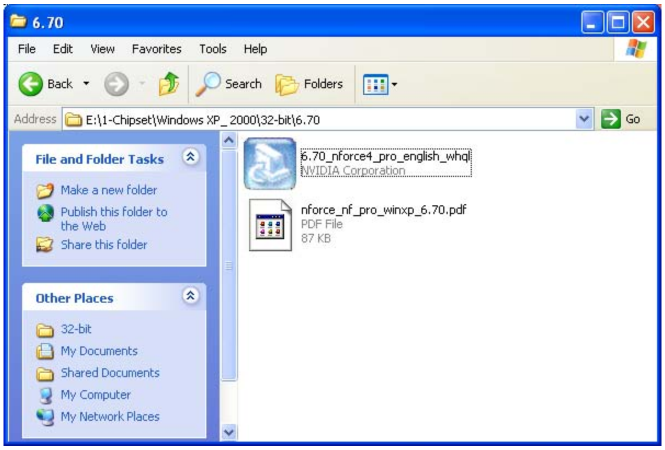


Figure 8-6: Chipset Driver Setup Icon

Step 8: The license agreement in **Figure 8-7** appears.

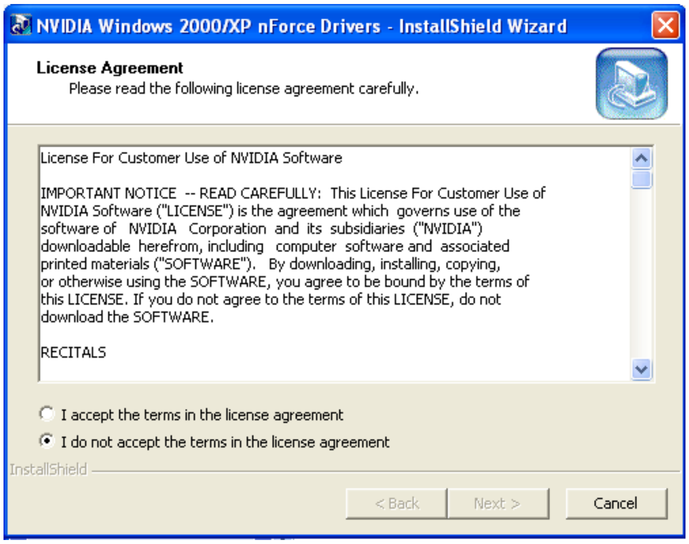


Figure 8-7: Chipset Driver Installation License Agreement

Step 9: Accept the terms of the license agreement. Click Next to continue.

Step 10: The folder selection screen in **Figure 8-8** appears.

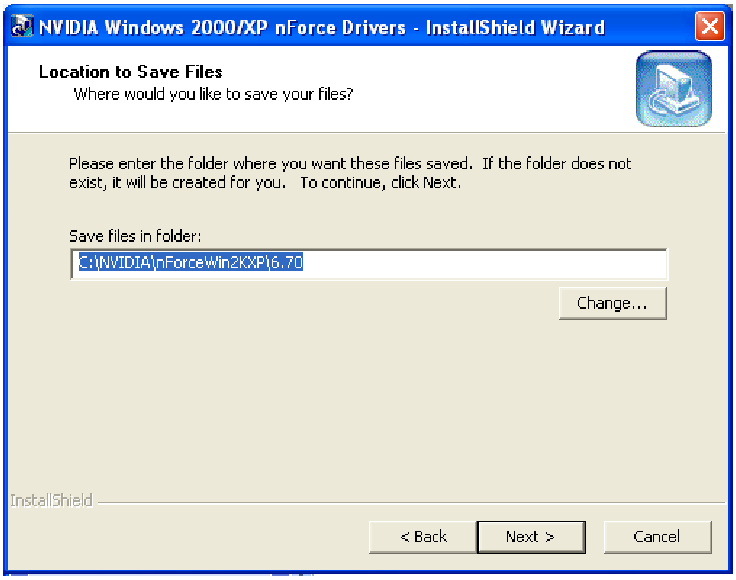


Figure 8-8: Chipset Driver Folder Selection

Step 11: Select the folder in which the driver must be installed.

Step 12: Installation files are extracted. See **Figure 8-9**.

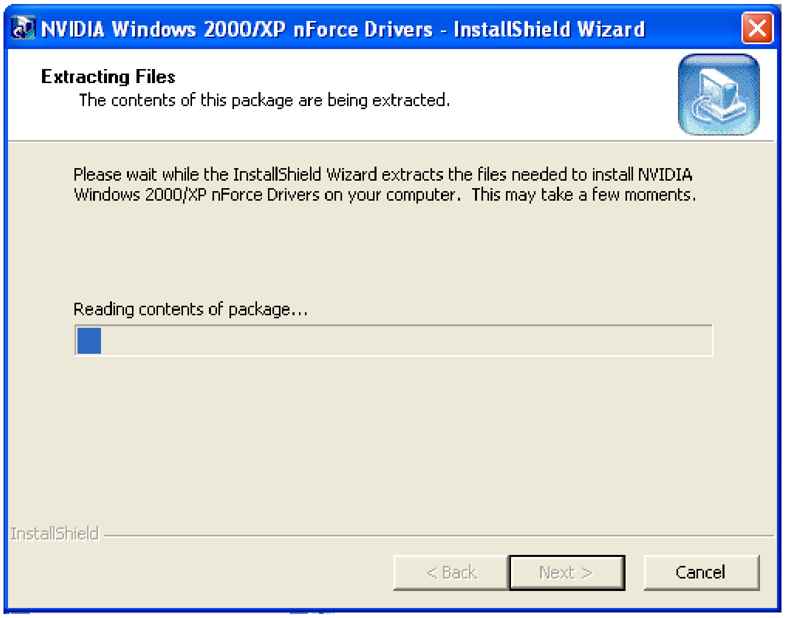


Figure 8-9: Welcome Screen

Step 13: The driver is then installed. See **Figure 8-10**.

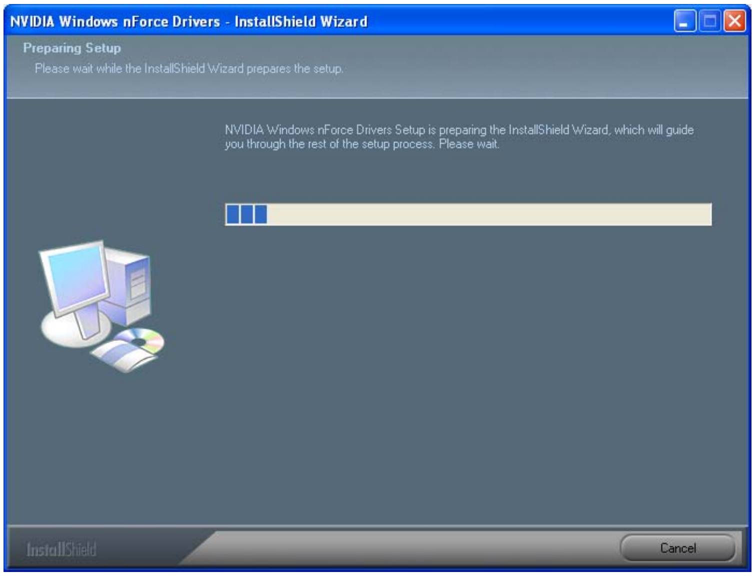


Figure 8-10: Chipset Driver Installation Complete

8.4 XGI VGA Driver Installation

To install the XGI VGA driver, please follow the steps below.

Step 1: Select VGA from the list in **Figure 8-2**.

Step 2: The screen in **Figure 8-11** appears.

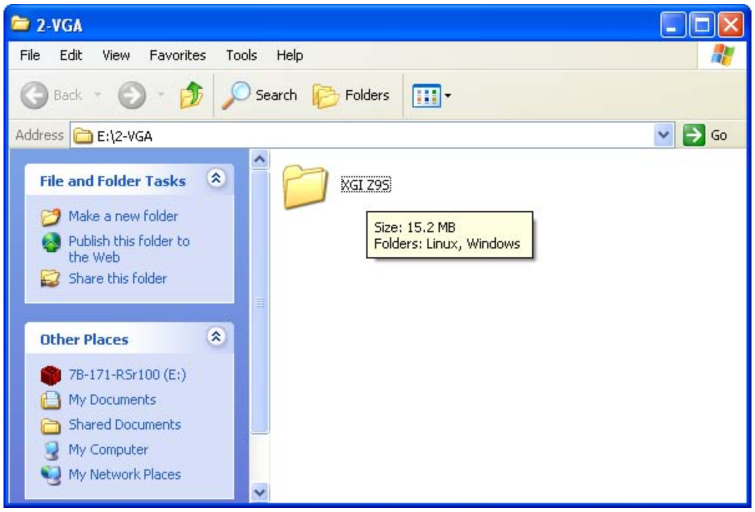


Figure 8-11: XGI Directory Icon

Step 3: Click the XGI Z9S directory icon.

Step 4: The screen in **Figure 8-13** appears.

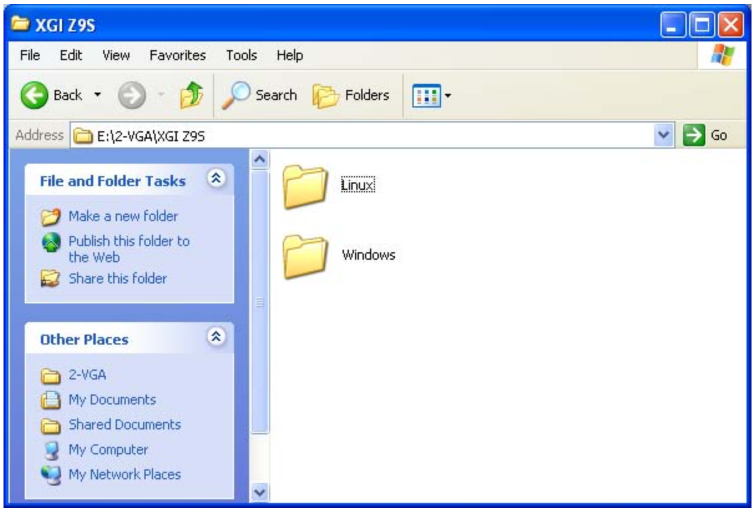


Figure 8-12: System Icon

Step 5: Select the operating installed in the system from **Figure 8-13**.

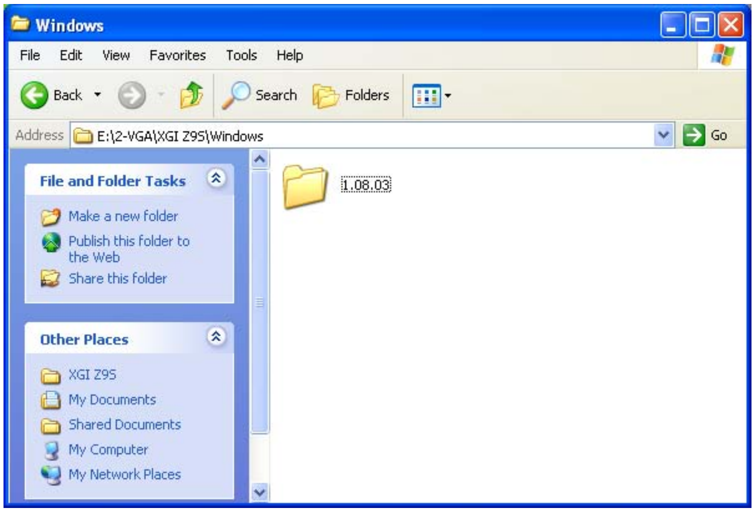


Figure 8-13: VGA Driver Revision Directory Icon

Step 6: Double click the directory icon in **Figure 8-14**.

Step 7: The screen in **Figure 8-15** appears.

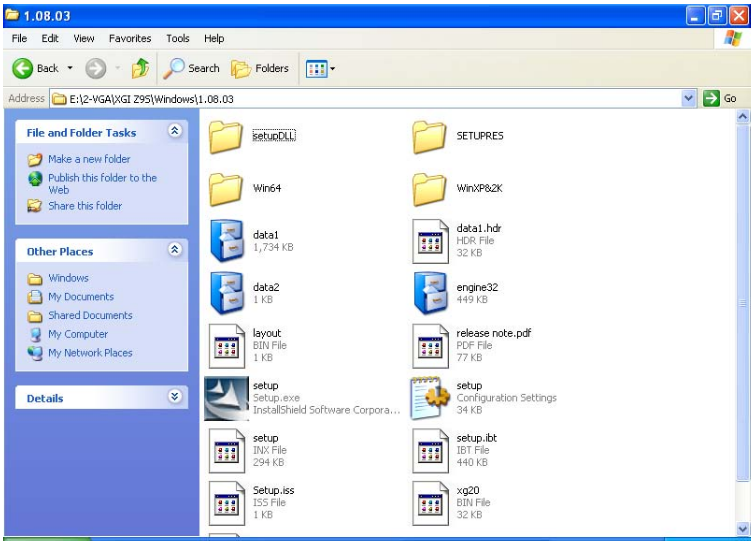


Figure 8-14: XGI VGA Driver Setup Icon

Step 8: Double-click the setup icon in **Figure 8-15**.

Step 9: The setup program is prepared as shown in **Figure 8-15**.

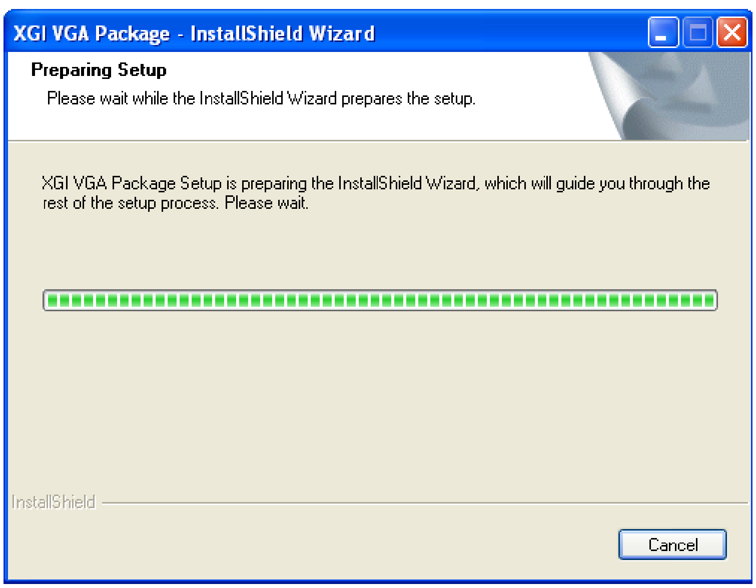


Figure 8-15: Preparing VGA Driver Setup

Step 10: The welcome screen in **Figure 8-17** next appears.

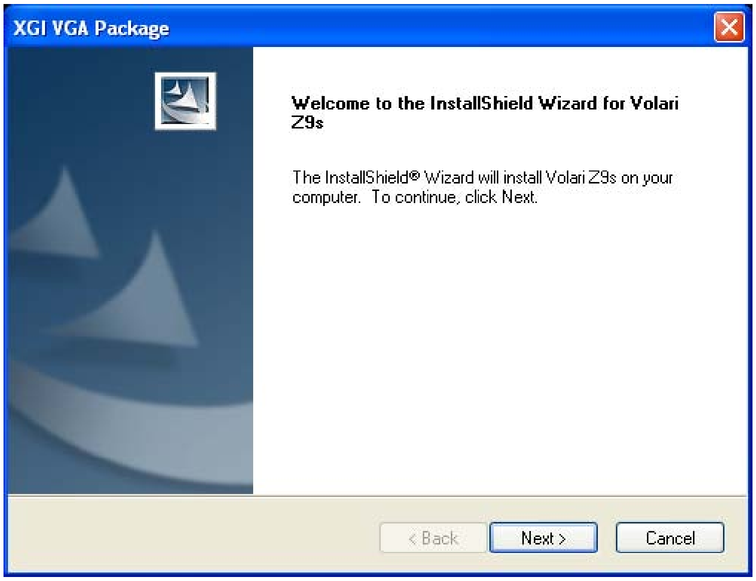


Figure 8-16: VGA Driver Welcome Screen

Step 11: Click **NEXT** to continue.

Step 12: The screen in Figure 8-17 may appear. Click **Continue Anyway**

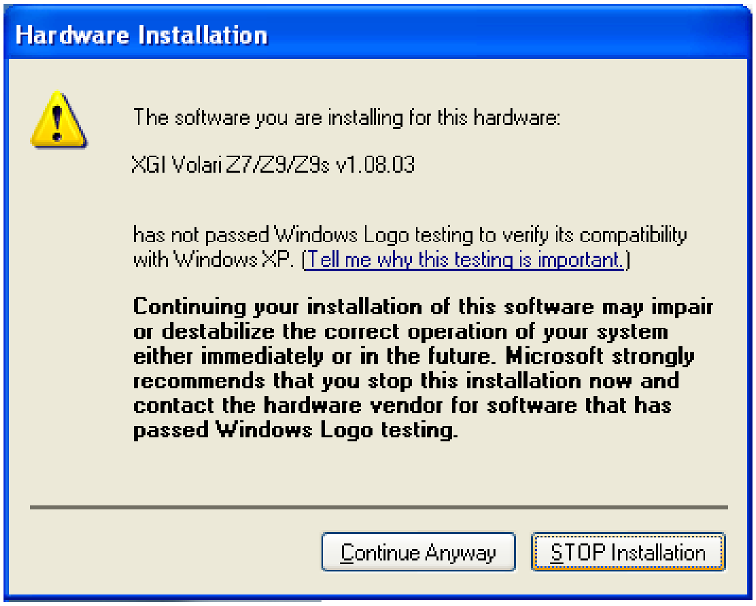


Figure 8-17: Windows Logo Testing

Step 13: The driver is installed.

Step 14: When the driver installation is complete, the window in Figure 8-18 appears.

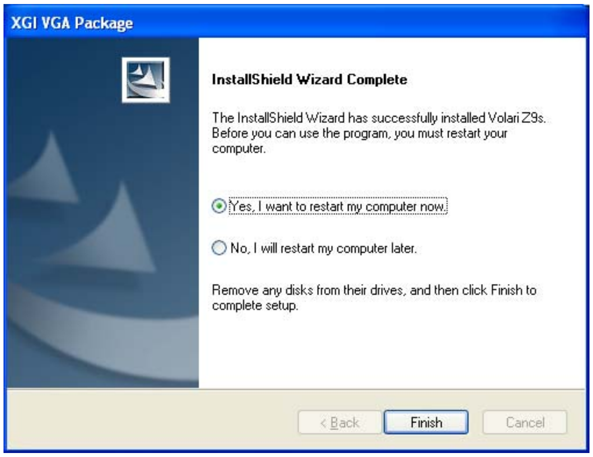


Figure 8-18: VGA Driver Installation Complete Screen

Step 15: Click **FINISH** to reboot the computer.

8.5 HD Audio Kit Driver Installation

To install the Realtek AC `97 audio driver, please follow the steps below.

8.5.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the Audio Controller option to [AC`97].

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

8.5.2 Driver Installation

To install the audio driver please follow the steps below.

Step 1: Select AUDIO from the list in **Figure 8-2**.

Step 2: A new window opens (**Figure 8-19**).

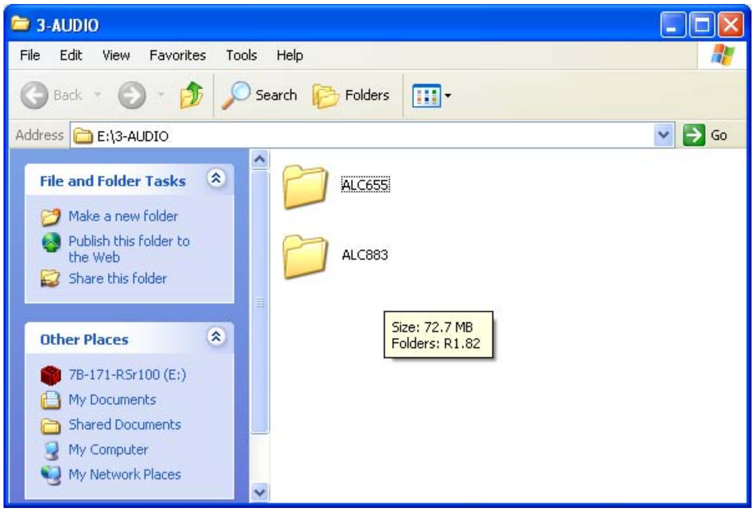


Figure 8-19: Select the Audio CODEC

Step 3: Double-click the ALC883 folder.

Step 4: Double click the directory icon in Figure 8-20.

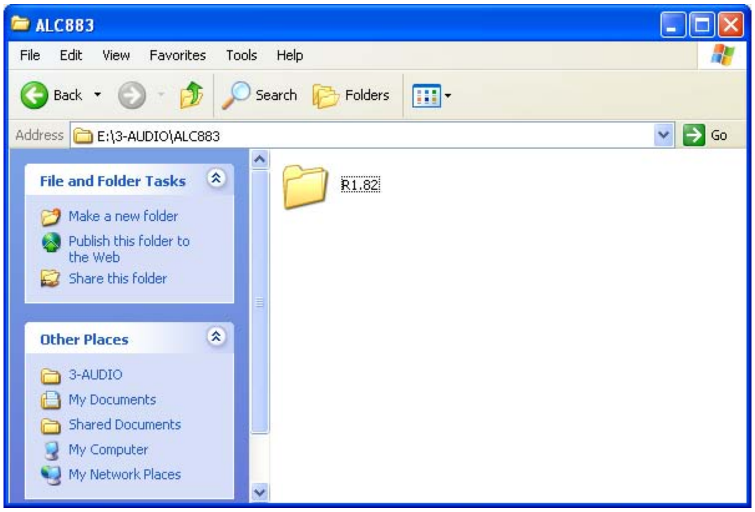


Figure 8-20: Driver Directory

Step 5: Select the Operating System Type installed on the system in **Figure 8-21**.

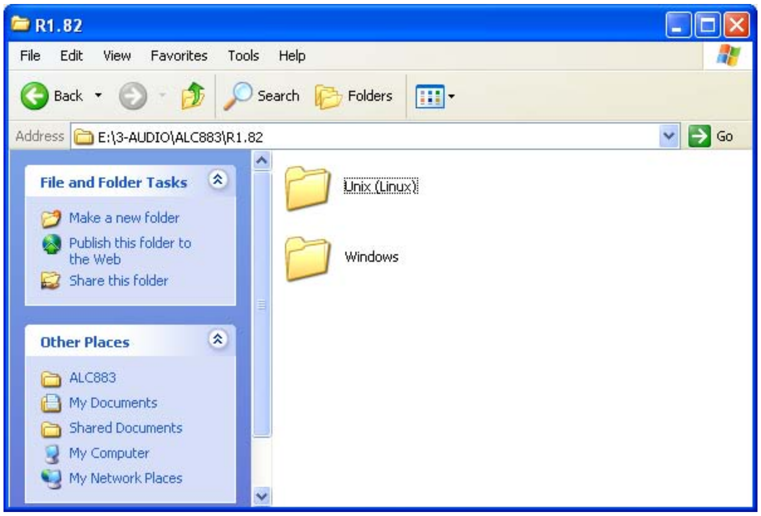


Figure 8-21: Select Operating System Type

Step 6: Select the operating system in Figure 8-22.

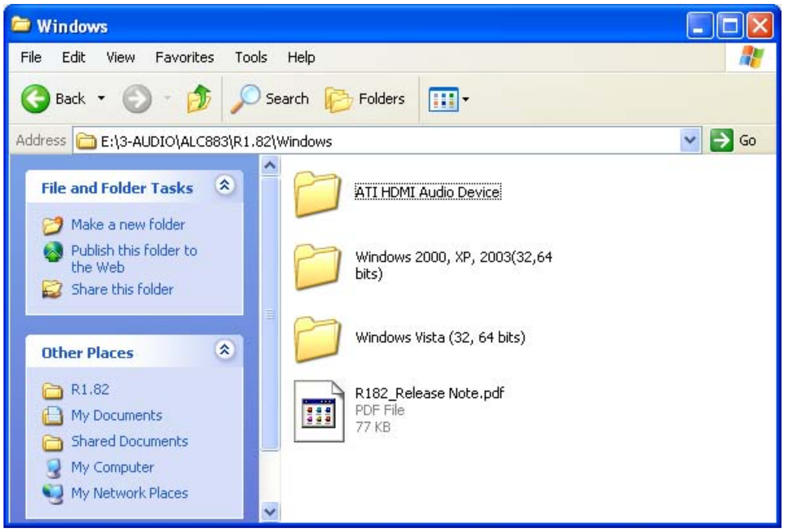


Figure 8-22: Operating System

Step 7: Double-click the Setup.exe program icon in **Figure 8-23**.

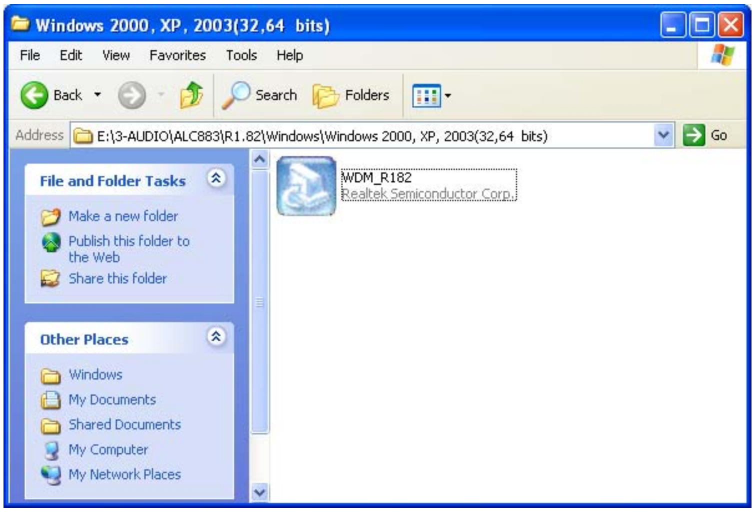


Figure 8-23: Locate the Setup Program Icon

Step 8: The InstallShield Wizard is prepared to guide the user through the rest of the process (**Figure 8-24**).

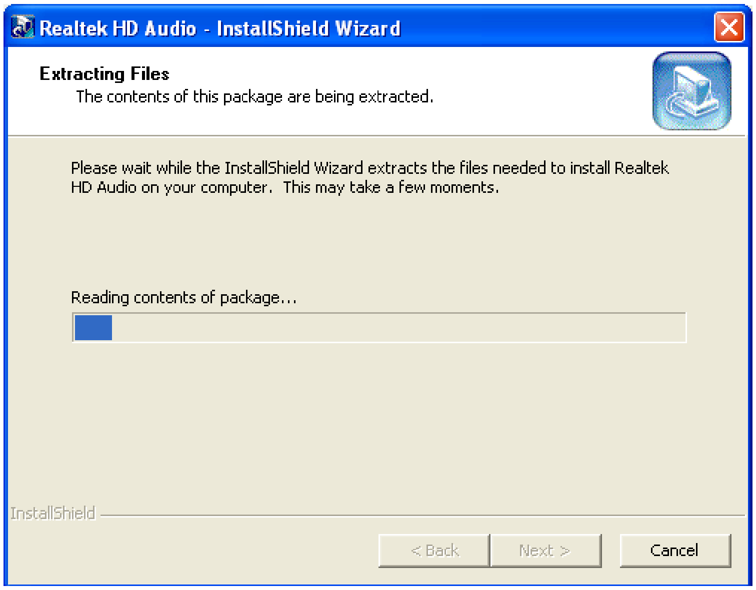


Figure 8-24: Preparing Setup Screen

Step 9: Once initialized, the InstallShield Wizard welcome screen appears (**Figure 8-25**).

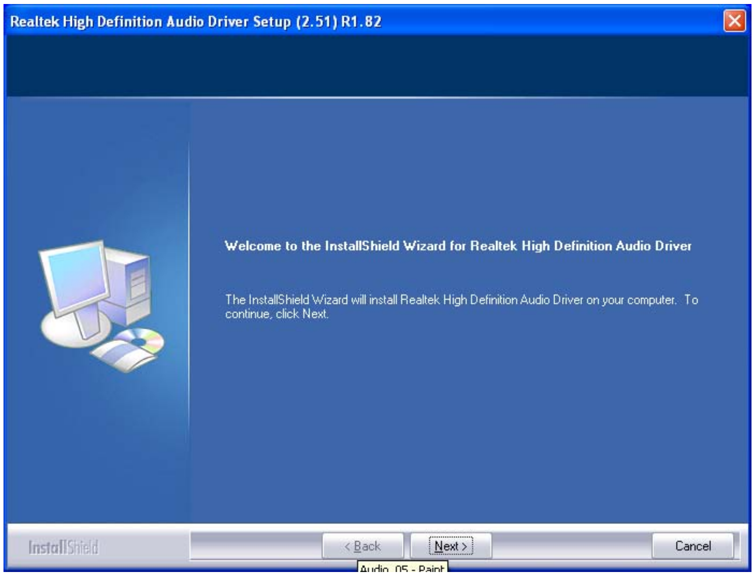


Figure 8-25: InstallShield Wizard Welcome Screen

Step 10: Click NEXT to continue the installation.

Step 11: InstallShield starts to install the new software as shown in **Figure 8-26**.

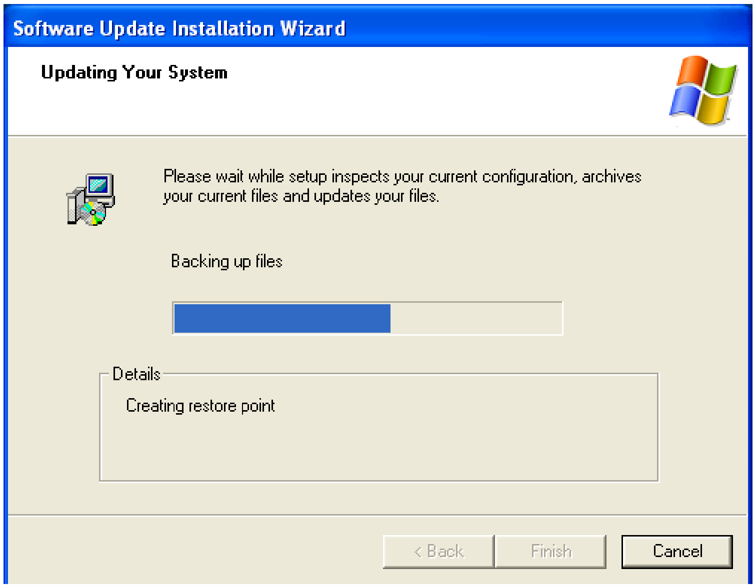


Figure 8-26: Audio Driver Software Configuration

Step 12: After the driver installation process is complete, a confirmation screen appears (**Figure 8-27**).

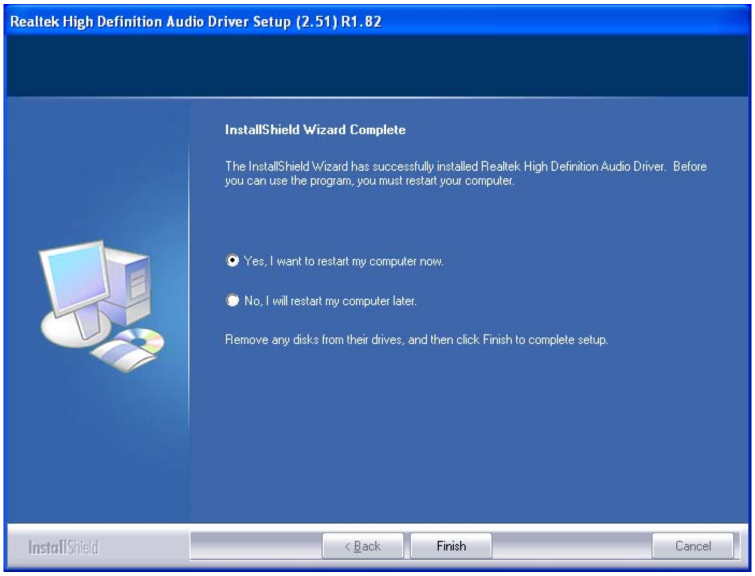


Figure 8-27: Restart the Computer

Step 13: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click FINISH to restart the computer.

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Appendix

A

BIOS Options

Appendix

B

Terminology

AC'97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
AMD64	AMD64 is the name for the 64-bit instruction set on AMD architecture. AMD64 supports Intel's x86 instruction architecture and is almost identical to Intel's x86-64 architecture.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data

	bus and have separate electrical contacts on each side of the module.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
HyperTransport™ Bus	The HyperTransport™ bus, which uses HyperTransport™ technology. interfaces an AMD CPU with the Northbridge. HyperTransport™ technology provides a high-speed, low latency, point-to-point link between the CPU and the Northbridge.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.
PCIe	PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAID	Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data

	transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table C-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

          MOV      AX, 6F02H          ;setting the time-out value
          MOV      BL, 30             ;time-out value is 48 seconds
          INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
          CMP      EXIT_AP, 1         ;is the application over?
          JNE      W_LOOP        ;No, restart the application

          MOV      AX, 6F02H     ;disable Watchdog Timer
          MOV      BL, 0         ;
          INT      15H
;
; EXIT ;
```

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Appendix

D

Address Mapping

D.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Graphics Controller
3C0-3DF	Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table D-1: IO Address Map

D.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table D-3: IRQ Mapping Table

D.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table D-4: IRQ Mapping Table

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Appendix

E

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the SPCIE-3600AM2

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the SPCIE-3600AM2.

- Windows XP with Service Pack 2
- Windows 2000 with Service Pack 4
- Microsoft Windows Vista Business (32-bit)
- Microsoft Windows Vista Business (64-bit)
- Fedora Core 7

E.2 Compatible Processors

The following Socket AM2 processors have been successfully tested on the SPCIE-3600AM2

CPU	Model Number	Frequency	Bus Speed	L2 Cache
AMD Opteron™	1214 HE	2.2 GHz	1,000 MHz	2 MB
AMD Opteron™	1210	1.8 GHz	1,000 MHz	2 MB
AMD Athlon™64 X2	+5600	2.8 GHz	1,000 MHz	2 MB
AMD Athlon™64	+3800	2.4 GHz	1,000 MHz	512 KB
AMD Sempron™	+3600	2.0 GHz	800 MHz	256 KB

E.3 Compatible Memory Modules

NOTE:

The memory modules listed below have been tested on the SPCIE-3600AM2 other memory modules that comply with the specifications may also work on the SPCIE-3600AM2 but have not been tested.

The following memory modules have been successfully tested on the SPCIE-3600AM2

Manufacturer	Model No.	Capacity	Speed
A-DATA	M2OAD5G3H3160L1C59	512 MB	667 MHz
CORSAIR	VS512 MB533D2	512 MB	533 MHz
DSL	512 MB DDRII 533 MHz	512 MB	533 MHz
KingBOX	512 MB533 MHz	512 MB	533 MHz
Kingston	KVR667D2N5/512	512 MB	667MHz
Transcend	1GB DDR2 667	1 GB	667 MHz
Transcend	2GB DDR2 800	2 GB	800 MHz
TwinMOS	8D25JK-TT	512 MB	800 MHz
UMAX	RMUMX 512DDR800C	512 MB	800 MHz
UNIGEN	UG64T6400L8DU-5AL	512 MB	533 MHz
UNIGEN	UG64T6400L8DU-8AK	512 MB	800 MHz
Winchip	1GB DDR2 800MHz	1 GB	800 MHz

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Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Material Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有”环境友好使用期限”的标签，此期限是估算这些物质”不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

Appendix

G

RAID Levels

G.1 Introduction

The SATA disks can be configured in a RAID array. RAID array setup is described in **Chapter 7**. The RAID array can be in one of the following configurations or levels:

- RAID 0
- RAID 1
- RAID 10
- RAID 5
- JBOD

These levels are described below:

G.1.1 RAID 0 or Disk Striping

RAID 0 is a disk striping method. Data is stripped across two or more disks. RAID 0 does not provide any redundant storage. When one of the drives fails, the data cannot be restored. Disk striping enables faster access to the disk sectors and faster reads and writers to and from the system.

G.1.2 RAID 1 or Disk Mirroring

RAID 1 is a disk mirroring method. Data on a first drive is copied exactly as is to a second drive. If one of the drives fails then data is backed up on the second drive and no information is lost. Although read and write speeds do increase, overall storage capacity is halved. That is, if two 50 GB drives are mirrored together, the total storage capacity is 100 GB. However, since one 50 GB drive is a mirror of the other 50 GB drive, only 50 GB of data can be stored on the system.

For disk mirroring two, four or six disks are required.

G.1.3 RAID 10 or Disk Mirroring and Striping

RAID 10 combines disk mirroring and striping. First data is mirrored on two drives (drive 1 and drive 2) and then the mirrored data is striped across two other drives (drive 3 and

drive 4). Although the read-write speeds are improved, the system still only has half of the actual storage capacity.

G.1.4 RAID 5

RAID 5 uses distributed parity blocks on different drives to enable the system to rebuild lost data if one of the disks crashes. The parity block is a binary representation of that data stored on the equivalent sectors of the other disks in the array. If one of the disks crashes then the disk can be rebuilt using binary techniques.

G.1.5 JBOD

JBOD is not technically a raid level but joins multiple drives into a single logical drive. Two or more drives are strung together and appear to the system as a single drive rather than as multiple drives.

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